



## **Africa – Up in smoke?**

The second report from  
the Working Group on Climate  
Change and Development



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# Foreword

*“The world’s wealthiest countries have emitted more than their fair share of greenhouse gases. Resultant floods, droughts and other climate change impacts continue to fall disproportionately on the world’s poorest people and countries, many of which are in Africa.”*

*I am delighted that such a broad group of environment and development organisations, many of which are faith based, have come together to speak with a common voice, drawing attention to climate change in the African context. It is well known that climate change will have particularly devastating effects on Africa. Indeed, case studies in this report suggest that this is already happening. But this report also shows the strength and creativity of African people in times of stress. What is needed most now is that Africans are supported in their efforts to build on these strengths.*

*The UK Prime Minister Tony Blair’s stated commitment to tackling climate change and helping Africa is most welcome. It is important to understand that Africa and climate change are intrinsically linked, as climate change will affect the welfare of Africans for years to come. Africans look forward to seeing some firm outcomes from these commitments during Blair’s presidency of the G8 and the European Union. Words will not be enough. The richest countries of the world, as represented by the G8, have a responsibility to help the poorest. This is not just charity, but a moral obligation. The world’s wealthiest countries have emitted more than their fair share of greenhouse gases. Resultant floods, droughts and other climate change impacts continue to fall disproportionately on the world’s poorest people and countries, many of which are in Africa.*

*Rich countries must therefore help poorer countries in two ways. They must reduce their greenhouse gas emissions so that the effects of climate change suffered by Africa’s poor do not get worse. They also have an obligation to help poor countries adapt to the negative impacts of climate change, which cannot be avoided.*

Archbishop Desmond Tutu

# Executive summary and recommendations

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## Africa – a special case for climate change

Global warming is already affecting Africa.<sup>1</sup> The Intergovernmental Panel on Climate Change (IPCC) predicts that, “the effects of climate change are expected to be greatest in developing countries in terms of loss of life and relative effects on investment and economy.” It describes Africa, the world’s poorest region, as “the continent most vulnerable to the impacts of projected change because widespread poverty limits adaptation capabilities”.<sup>2</sup>

Small-scale farming provides most of the food produced in Africa, as well as employment for 70 per cent of working people.<sup>3</sup> These simple facts, coupled with farming being overwhelmingly dependent on direct rainfall, mean that Africa is exceptionally vulnerable to the uncertainties and weather extremes of global warming.

But a vulnerable agricultural system is not the only problem. The continent is more exposed to the impacts of climate change than many other regions in the world.<sup>4</sup> Its high sensitivity to climate is exacerbated by other factors such as widespread poverty, recurrent droughts and floods, an immediate daily dependence on natural resources and biodiversity, a heavy disease burden, and the numerous conflicts that have engulfed the continent. There are further complications introduced by an unjust international trade system and the burden of unpayable debt.

All these factors call for a new model of development in which strategies to increase human resilience in the face of climate change and the stability of ecosystems are central. It calls for a new test on every policy and project, in which the key question will be, “Are you increasing or decreasing people’s vulnerability to the climate?”

Above all, the challenge calls for a new flexibility and not a one-size-fits-all, neo-liberal-driven approach to development. As this Report observes, just as an investment portfolio spreads risk by including a variety of stocks and shares, so an agricultural system geared to manage the risks of changing climate requires a rich diversity of approaches in terms of what is grown, and how it is grown.

But, even where the links to climate change are under-appreciated, Africa is a continent only too aware of the threat of ‘natural’ disasters and the obstacles they pose to poverty reduction. Mozambique hit world headlines at the beginning of the new Millennium when it was hit by floods on a biblical scale. Now, its Action Plan for the Reduction of Absolute Poverty 2001–2005 states: “*Natural disasters...*

*constitute an obstacle to a definitive break with certain degrees and patterns of poverty. Therefore, measures aimed at managing these risks are of the utmost importance.*” More generally, the environment action plan of the New Partnership for Africa’s Development (NEPAD) observes, “*Natural disasters... cause considerable human suffering and economic damage in the continent.*” And quite recently, governments agreed at the World Conference on Disaster Reduction in January 2005 that, “*Disasters in Africa pose a major obstacle to the African continent’s efforts to achieve sustainable development.*”<sup>5</sup>

Unfortunately, even this level of awareness is not the same as having a coherent and adequately funded approach to tackling the problem.

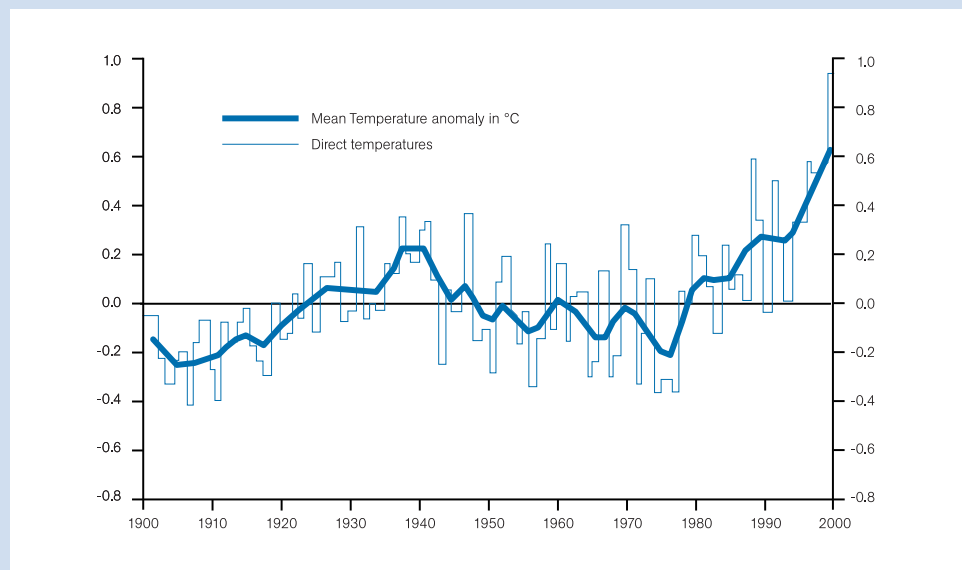
Recently the role of developing new technology has been strongly emphasised. In particular, governments have focused on how to improve weather forecasting in Africa. There is a consensus among development groups, however, that a greater and more urgent challenge is strengthening communities from the bottom-up, and building on their own coping strategies to live with global warming. The need to give much more support to small-scale farming comes up again and again from the field experience of development groups, along with the priority for access to energy from sustainable sources.

We believe it is not necessary to wait years for more research on climate change before investing in disaster risk reduction. Governments have agreed on the need for action, and tools and methods for protecting communities from disasters are well developed. Now they need to be employed immediately in African countries and communities on a much greater scale.

At the moment, spending priorities are perverse. For every \$1 spent on preparing for disaster, a further \$7 is saved in the cost of recovering from it. Yet, as in the case of Mozambique, requests for resources to prepare for disasters before the great floods went seriously under-funded, leaving a huge disaster-relief bill to be paid after the floods.

This Report finds that concerns about the effects of climate change on rural African societies are more than justified. Climate change is happening, and it is affecting livelihoods that depend on the natural environment, which, in Africa, means nearly everyone. However, even without adequate support, far from being passive victims, people recognise even small changes in climate, and are taking steps to respond to them.

## Climate predictions<sup>6</sup> – the past 100 years in Africa



(Source: UNEP/GRID Arendal)

Climate Change is happening and when all the impacts are added up, everyone will lose out sooner or later. Some people will adapt more successfully than others, and climate change may well result in a polarisation of wealth and well-being in ways we have not seen before. Polarisation of wealth can, for example, create an overall drag on human development. In addition to the core recommendations already made by the Working Group on Climate Change and Development, in the light of Africa's special circumstances, these further proposals are considered a minimum needed to manage the impact of global warming on the continent. Without them, whatever achievements in development may have been won in Africa in the last few decades could be reversed by climate change.

### Recommendations for Africa:

#### Increased support for small-scale agriculture:

Dramatically increased support for small-scale agriculture, and an approach to farming based on maximum appropriate diversification. Highly diverse systems, as opposed to commercial monocultures, have been shown time and again to be more resilient – and more productive. Farming based on expensive and energy-intensive artificial inputs will be both vulnerable to fuel price rises and further add to the problem of climate change. Vitality, small-scale farmers need supporting by a favourable policy environment and supportive research that addresses the problem that they, themselves have identified. Boosting production is crucial, especially

Since 2001, consecutive dry spells in southern Africa have led to serious food shortages. According to the UN Office for the Coordination of Humanitarian Affairs the drought of 2002–03 resulted, in a food deficit of 3.3 million tonnes, with an estimated 14.4 million people in need of assistance.<sup>7</sup> A half-century-long trend of failing rainfall in Southern Africa is set to continue according to new research from the US-based National Center for Atmospheric Research (NCAR). And it appears that the pattern is closely linked to significant warming of the Indian Ocean, which because it otherwise lacks the natural variability of the Pacific and Atlantic, is reported to be a clear fingerprint of human-caused climate change. "In our models, the Indian Ocean shows very clear and dramatic warming into the future, which means more and more drought for southern Africa," said Dr. James W. Hurrell, an author of the study. By 2050, the NCAR report indicates that the February-to-April wet season there could suffer a 10 to 20 per cent drying compared to the average for the previous 50 years. And according to Oxford-based academic Dr. Richard Washington, "When the rains fail, people die."<sup>8</sup>

Africa's coastal area already experiences the environmental problems of coastal erosion, flooding, and subsidence. Exploitation of coastal resources, development and population pressures are all drivers. Climate change is expected to intensify these problems. The IPCC predicts, "Climate change will exacerbate existing physical, ecological/biological, and socio-economic stresses on the African coastal zone."

- "14 countries in Africa are subject to water stress or water scarcity" and "A further 11 countries will join them in the next 25 years."<sup>9</sup> Between 1970 and 1995, Africa experienced a 2.8 times decrease in water availability.<sup>10</sup>
- Land areas may warm by as much as 1.6°C over the Sahara and semi-arid regions of southern Africa by 2050.
- In southern Africa and parts of the Horn, rainfall is projected to decline by about 10 per cent by 2050.
- Sea level is projected to rise around 25cm by 2050.
- The west coast of Africa is currently affected by storm surges and is at risk from extreme storm events, erosion and inundation. With climate change, tidal waves and storm surges may increase and inundation could become a major concern. East Africa's coastal zone will also be affected: climatic variation and sea-level rise may decrease coral and patch reefs along the continental shelf, reducing their buffer effects and increasing the likelihood of east coast erosion.

because of the enormous burden of HIV/AIDS, and doing so requires systems that combine new insights and technologies with the wisdom of tradition.

### **Cut rich country greenhouse gas emissions:**

Rich countries need to go far beyond their targets for reducing greenhouse gas emissions, set under the Kyoto Protocol. Instead they need to cut emissions to a level commensurate with halting global warming and so that temperature rise is kept well below 2°C above pre-industrial levels. Commitments to cut emissions should be progressively raised up until 2012 in a way that puts countries on track to cuts of between 60 and 80 per cent by 2050. In this light, G8 countries should establish a robust policy framework for long-term future action on climate change post 2012. All G8 countries should commit to achieving caps on emissions at a national level, that are compatible with a fair a global solution that is rooted in human equality and capable of stopping dangerous climate change.

### **Focus on local needs first:**

Africa needs to be freed from a one-size-fits-all development approach. Effective responses to climate change will differ everywhere depending on local circumstances, so a new flexibility is needed. The greatest challenge is securing livelihoods at the local level.

### **Map likely health impacts:**

Where health is concerned the challenge to the international community is to help map the complex impacts of global warming, and ensure that both the resources are available to tackle them, and that the development policy framework does not make things worse. For example, as climate change puts stress on scarce water resources, a dogmatic approach to water privatisation could easily increase the vulnerability of millions of people in Africa.

### **Help Africa leapfrog 'dirty development':**

The exploitation of fossil fuels in Africa does little for the development or security of its people. But the potential for sustainable and renewable energy on the continent is enormous, and the market, especially in poor communities, is huge. To meet people's need for energy, improve health at the household level, and to help Africa leapfrog 'dirty development', international donors and financial institutions should switch investment from fossil fuels into promoting access to renewable and sustainable energy, remove obstacles to technology transfer, and adopt targets and timetables to achieve those objectives.

### **Support community coping strategies:**

Global warming presents a huge challenge to the coherence and coordination of aid. For example, donors are focusing strongly on the role of technology. But our experience tells us that promoting disaster reduction at the local level by supporting community coping strategies, is far more effective and yields

immediate benefits that stretch beyond just tackling climate-driven disasters. Later on in this Report, we make several detailed recommendations on how to do this. The integration of disaster risk reduction in relief, reconstruction, development programming and poverty reduction plans should now be a priority. In our experience 'good adaptation' also makes 'good development'.

### **Release aid quickly and set targets for local and regional procurement:**

More efficient systems are needed to ensure that aid is released quickly and that humanitarian aid is well targeted when disasters strike. To ensure the long-term development benefits of money spent on disasters, there should be targets for local and regional procurement set for governments and agencies. This would help prevent the leakage of relief money from affected communities.

### **Implement existing agreements on environment and development:**

The international community specifically should implement the agreement made at the World Summit on Sustainable Development (WSSD) to help Africa prepare for, and mitigate disasters at both a community and national level. This should include, as agreed at the WSSD, promoting "...community-based disaster management planning by local authorities, including through training activities and raising public awareness".

### **Test whether initiatives are climate proof and climate friendly:**

All policies and programmes should face the test of whether they will leave people in Africa more or less vulnerable to the effects of global warming. The test will be: Is this climate friendly and climate proof? At the very latest, in line with the recommendation of the Commission for Africa, climate change should be 'mainstreamed' within development policies, planning and activities by 2008.

### **New and additional funding:**

All funding to help Africa adapt to global warming should be new and additional to existing funds, and seen not as aid but as an obligation of the rich countries who created the problem.

### **The Up in Smoke Agenda**

*Up in Smoke?*, the first report of the Working Group on Climate Change and Development, joined the environment and development communities in a united view on the minimum action necessary to deal with the threat of global warming to human development. This is what it called for in October 2004. If anything, the proposals are even more pressing now than they were before.

The environmental and development community, like the rest of humanity, is faced with three overarching challenges:

- 1 How to stop and reverse further global warming.
- 2 How to live with the degree of global warming that cannot be stopped.

- How to design a new model for human progress and development that is *climate proof* and *climate friendly* and gives everyone a fair share of the natural resources on which we all depend.

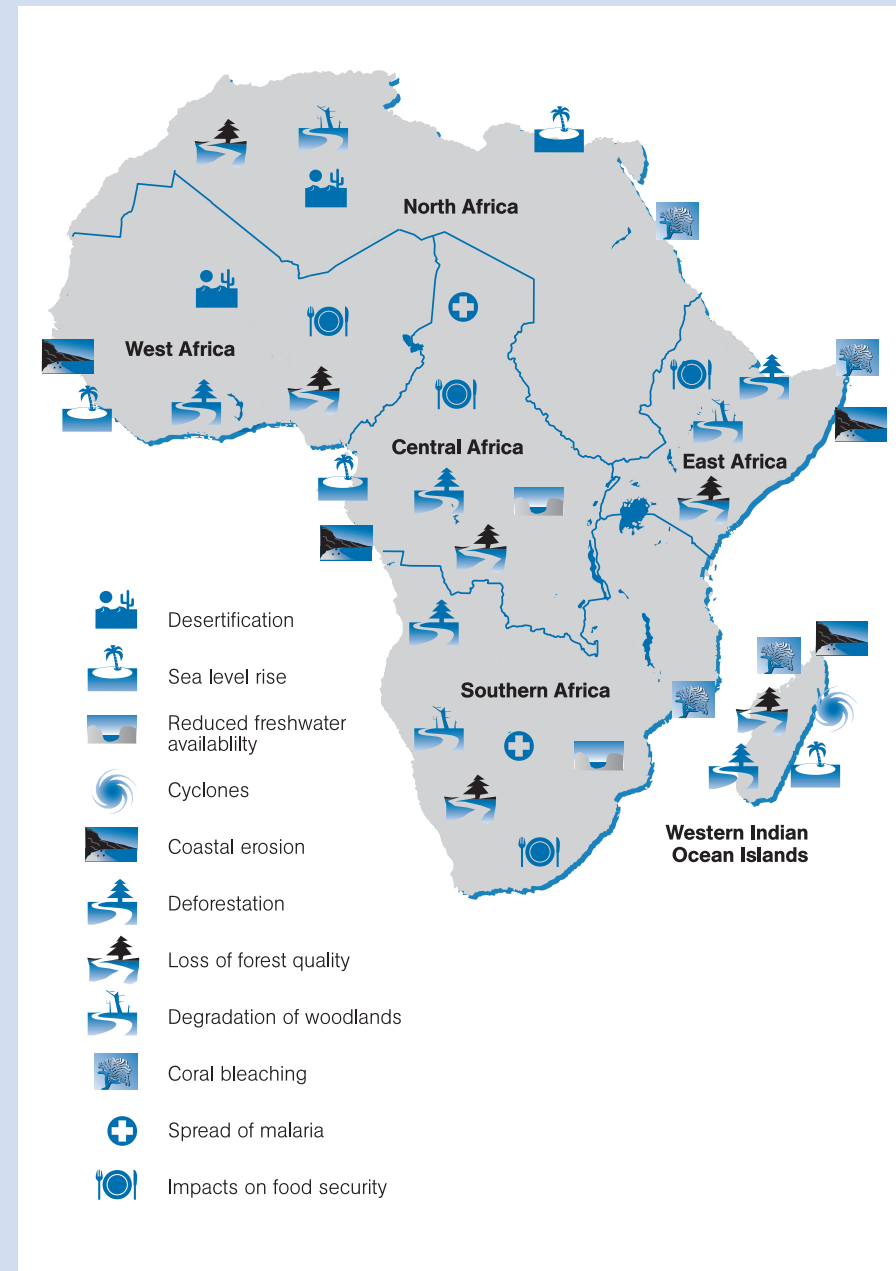
In that light, urgent priorities include:

- A global risk assessment of the likely costs of adaptation to climate change in poor countries.
- Commensurate new funds and other resources made available by industrialised countries for poor country adaptation, bearing in mind that rich country subsidies to their domestic, fossil-fuel industries stood at \$73 billion per year in the late 1990s.
- Effective and efficient arrangements to respond to the increasing burden of climate-related disaster relief.
- Development models based on risk reduction, incorporating community-driven coping strategies in adaptation and disaster preparedness.
- Disaster awareness campaigns with materials produced at community level and made available in local languages.
- Co-ordinated plans, from local to international levels, for relocating threatened communities with appropriate political, legal, and financial resources.

In addition to these, as organisations striving to improve human well-being in the face of enormous challenges, we will:

- Work toward a collective understanding of the threat.
- Share the best of our knowledge about how to build human and ecosystem resilience and live with the degree of global warming that is now unstoppable.
- Do everything in our power to stop dangerous climate change and help bring about a global solution that is fair and rooted in human equality.

## Climate change vulnerability in Africa



(Sources: UNEP/GRID Arendal/Anna Balance, 2002)

# Food, farming and the environment – threats and building resilience

## Environment – the foundation of livelihoods<sup>11</sup>

Africa's social and economic development is now even more in danger because climate change threatens to undermine the integrity of the continent's rich but fragile ecosystems.<sup>12</sup> In Africa, these natural systems form the foundation of the economy of most countries, from which the majority of the population derive their livelihood.<sup>13</sup> Africa contains about one-fifth of all known species of plants, mammals, and birds, as well as one-sixth of amphibians and reptiles. Biodiversity in Africa, which principally occurs outside formally conserved areas, is under threat from climate change and other stresses. Savannahs, tropical forests, coral reef marine and freshwater habitats, wetlands and East Africa montane ecosystems are all at risk.

Poor people, especially those living in marginal environments and in areas with low agricultural productivity in Africa, depend directly on genetic, species and ecosystem diversity to support their way of life. As a result of this dependency, any impact that climate change has on natural systems will threaten the livelihoods, food intake and health of the population.

With the extinction of plant species used in traditional medicines in Africa, it is expected that the change in climate will impact on people's ability to tackle illness. The World Health Organisation estimates that 80 per cent of the world's population in developing countries rely on these plants for primary health care. In Mali, traditional medicines have declined because many medicinal plants have been wiped out by constant drought.<sup>14</sup>

Livelihoods built for generations on particular patterns of farming may also become quickly unviable. If not addressed, climate change is estimated to place an additional 80–120 million people at risk of hunger; 70 to 80 per cent of these will be in Africa.<sup>15</sup> With increasing temperatures and extreme weather events, climate change will further erode the quality of the natural resource base, thereby reinforcing conditions of poverty.

*“Drought is becoming more and more frequent leading to drying-out of soil and the disappearance of vegetation. The life of an entire population is on hold, waiting for clouds, which promise less and less rain and which finally destroy the hope that cattle breeders and their herds will enjoy healthy pastures. They also destroy people's hope for a better tomorrow which would usher in an abundant harvest so passionately awaited by farmers and their creditors.”*

**Malian development group TNT**

## Mozambique: climate change, disruption and renewing rural livelihoods

Despite civil war and major floods and drought, Mozambique has emerged in the 21st century as a country of progress and possibilities, a flagship of renewal in Africa. The Adaptive research project set out to investigate how rural people have adapted to these disturbances so that rural communities can be better supported in the face of future changes, especially climate change.<sup>16</sup>

Research focused on the community of Nwadjahane in Gaza Province in southern Mozambique. The village was established in the 1980s following displacement from surrounding areas during the civil war. Over the years, villagers have had to live with political and economic instability, drought, and major flood and storm damage. Despite these difficult circumstances, villagers have developed creative and innovative ways of coping and adapting to this uncertainty and change.

Social networks are the links and connections that individuals and households have with family, neighbours and friends. Within Nwadjahane, these have evolved and changed over the last 20 years. A fundamental shift is from paying people with cash in exchange for help with tasks on the farm, to 'traditional' forms of non-cash bartering, such as exchanging labour. Villagers explain that this is due to the combined drivers of less cash within the local economy (linked to wider economic processes) and the perceived increase in the number of weather-related disturbances.

Increasingly frequent and severe droughts, floods, and storms have led to either less cash being available from crop sales, or simply the need for more labour to replant or repair damaged crops or farm infrastructure. One of the recognised positive outcomes from this shift is an increased sense of solidarity with neighbours.

## Using the landscape to spread risk

Villagers in Nwadjahane farm both the fertile lowlands through irrigation and the higher sandy dryland fields. Increasingly severe floods and droughts over the last two decades have increased demand from households for plots of land in *both* areas. While the lowland can produce good crops of rice, vegetables and potatoes, these can be destroyed during floods. Highland areas can produce good crops of maize and cassava during flood years.

However, during drought years the highlands are less productive and families rely on lowland production. Households with land in just one area have started to develop informal farming associations to lobby those responsible for land



allocation. They've successfully managed to gain access to new areas to farm. This is especially important for very poor households as it enables them to share some of the production costs and risks, thus increasing their overall resilience to both droughts and floods. A lesson for development agencies is that external support to these farming systems needs to be careful not to favour one type of farming over another as it is the *combination* that provides resilience to climatic disruptions.

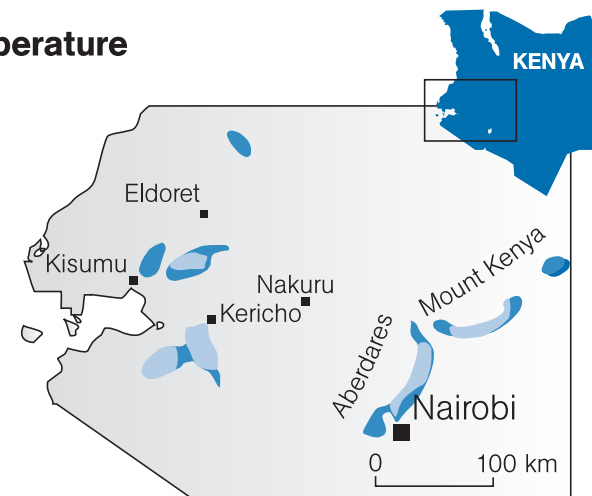
These farming associations have become the focus of innovative and experimental farming practices. By working in groups, villagers are able to spread the risk of new practices and technologies and learn for themselves through trial, error and experimentation. When successful, farmers have been able to take the lessons learnt back to their own individual farms. For example, 45 per cent of those interviewed had changed to more drought-resistant species of rice, maize, cassava and sweet potato at some point during the last six years as a direct result of the information exchange within and beyond the farming associations. The farming associations act as a buffer against initial risk with both poor and wealthy households able to experiment. The associations have also been particularly popular with groups of women, leading to a strengthening of their position within the farming community. With the support of extension officers these types of initiatives can strengthen livelihoods in the face of climate change and make livelihood activities more profitable and secure.

Within the Nwadjahane community, individuals, households, and formal and informal groupings of people are all looking for ways in which they can reduce their vulnerability to disturbances and increase the resiliency of their livelihoods. Some adaptations are driven specifically by experience of extreme climatic events, but many come from a combination of climatic, environmental, economic, political and cultural issues. The study shows that we need to take climate change seriously but that it *must* be viewed within the everyday context of people's lives.

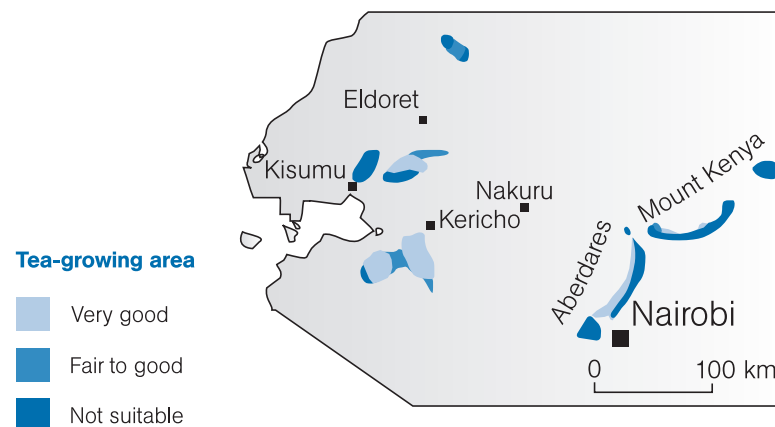
The Mozambique Government has recognised this. It sees the need to support local level attempts to build resilience; national planning strategies are deliberately addressing these issues. Some sectors of agriculture are being encouraged to commercialise at a large scale, while smallholders are being encouraged to participate in local level planning to build the human capacity for livelihood renewal. Thus climate change in Mozambique is not being viewed in isolation; it is being dealt with within the context of wider development issues.

## Impact of temperature rise on tea in Kenya

### Today's temperature



### A temperature increase of 2°C



*If temperatures rise by 2°C, large areas of Kenya currently suited to growing tea would become unsuitable. Were this to happen, the impact on Kenya's economy would be enormous. Kenya is the world's fourth-largest tea producer and second-biggest exporter. Tea provides nearly a quarter of the country's export earnings. Three million Kenyans, 10 per cent of the population, are directly or indirectly employed in the tea industry. But the impact on poor people could be even greater. Some 400,000 smallholders grow 60 per cent of the country's tea, with large estates growing the rest. The large tea estates may have the capital to afford the extra irrigation and other inputs that would be needed to cope with the effects of climate change, but smallholders may not be able to.*

**Source:** UNEP/GRID Arenal/Otto Simonet

## Agro-ecology: the way forward for climate-resilient food production<sup>17</sup>

Agriculture in Africa suffers from a persistent lack of investment. It's an issue both at the national level, with African governments cutting back on farming support services, and internationally, with funding from the EU, for example, going more to 'governance' and 'infrastructure'.

Small-scale agriculture provides most of the food produced in Africa, and employs 70 per cent of the workforce. But a lack of investment in drought-resistant farming is in danger of creating serious problems for its ability to adapt in a warming world. Just as financial investors spread risk, it makes sense for farmers to do so as well in the face of global warming. A diversity of both approaches to cropping and to a range of crops is the way to achieve that.

This, in turn, means that farmers need access to seeds that are adapted to drought or reduced rainfall during critical stages in the growing season. A variety of forces have led to a reduced availability of local seeds, and increased dependence on hybrid seeds and crops like maize that are not well adapted to these conditions. Maize needs rain during the development of the cobs, and a gap in rainfall at a crucial time leads to crop failure. Exactly this is happening in Zambia in 2005, despite plentiful rain earlier in the rainy season.

Another pressure comes from the concentration of ownership in the seed industry into a handful of large corporations. Ten companies now control one-third of the global seed industry, further threatening agricultural biodiversity.

A key aspect of an agro-ecological approach is how different developments can produce synergies, leading to win-win situations such as increased production without additional external resources. Diverse cropping systems yield much more produce per unit of land than the mono-cropping favoured by 'modern' agricultural systems. They are also much more suited to the harsh conditions in which most farmers in Sub-Saharan Africa operate.

The example given from the semi-arid area in east Kenya illustrates the process. Sustainable agriculture is a method of farming based on human needs for food, income, shelter, and fuelwood. It also builds an understanding of the long-term effect of our activities on the environment. It integrates practices for plant and animal production, with a focus on pest predator relationships, moisture and plants, soil health and the chemical and physical relationship between plants and animals on the farm.

Most sustainable agricultural initiatives seek to reduce soil erosion and to make improvements to the soil's physical structure through its organic matter content,

## Pooling resources in east Kenya<sup>18</sup>

A pioneer farmer and his neighbours in east Kenya pooled resources and decided to share information on farming technologies. They specifically wanted to carry out soil and water conservation, together with the construction of an earth pan to store floodwater. Using the water, he tried kitchen gardening using bucket-drip irrigation next to his homestead and was very successful. The project depended on the availability of water and, with help, the group installed a well and hand pump, sharing 50 per cent of the cost.

To reduce the damage from chafer grubs, which attack and damage the roots of maize seedlings, two methods were used which involved no chemicals:

- Applying manure increases the tolerance of the maize plant to damage from chafer grubs. The nutrients in the manure accelerate root growth and enable the seedlings to recover after attack.
- Early land preparation exposes the grubs' eggs to heat on the surface, which kills them, reducing the number of eggs that hatch.

Together, these two methods reduce damage from 50 per cent to a mere 5–10 per cent without a biotechnologist in sight. The farmer and his wife also attended a workshop on different uses of the neem tree and its products for pest control, animal and human health.

Since sustainable agricultural techniques were adopted, crop yields have increased four-fold. Livestock manure increases water retention and provides nutrients to achieve higher yields. Using these local resources and skills, the farmers have discarded the previous cut, burn, plant, and shift cropping system in favour of increasing yields from the same piece of land and leaving the rest for livestock pasture and environmental conservation. Currently all the farmer's cropping land is subject to rainwater conservation. He even harvests runoff water from the roadside. If the water supply is maintained he intends to grow more cash crops like watermelons and grafted yellow passion fruit. Both have a ready market. This will increase his income to see his son through university, increase the food supply to the local community and hotel industry, and also increase productivity from his land.

However, the key to the wider adoption of sustainable agricultural techniques depends on their promotion through official agricultural support, so called 'extension services'. In turn they need to be backed by a favourable policy climate and supportive research that addresses problems identified by farmers.



*Gola forests chiefs at project meeting*

and water-holding capacity. Water is a clear constraint in many rains-fed systems. When water is better harvested and conserved, it may be the key factor leading to improved agricultural productivity. Provided the soil's nutrient balance is maintained, better water management means better cropping.

### **Protecting the Gola Forests in Sierra Leone<sup>19</sup>**

Deforestation accounts for between 20 and 30 per cent of all greenhouse gas emissions worldwide and has devastating effects on both biodiversity and local communities. The Upper Guinea Forest, which once stretched from Guinea to Ghana, now covers less than one-third of its original area and is highly fragmented into comparatively small areas. Sierra Leone has only one-seventh of its original Upper Guinea Forest remaining, half of which is made up of the 750-square-kilometre Gola Forests in the southeast of the country.

The RSPB and the Conservation Society of Sierra Leone (CSSL) developed one example of an innovative approach to natural resource management that balances peoples' livelihoods with sustainability. They formed a long-term partnership with the Sierra Leone Government and seven chiefdoms to protect the Gola Forests.

Following the recent conflict in Sierra Leone, there was a concern that commercial logging would resume in the Gola Forests, bringing in much needed but short-term money. Instead, the CSSL and the RSPB have concluded a 'conservation concession' agreement with the Sierra Leone Government under which the forest management rights will be used for conservation rather than logging.

### **Senegal: the dangers of large-scale mono-cropping<sup>20</sup>**

In comparison to the positive examples shown in Mozambique and Kenya, Senegal's experience of peanut farming leaves them more, not less, vulnerable to climate change. Climatic phenomena, such as the drought cycles of the last two decades, have worsened desertification. Vegetation cover has been increasingly degraded and there has been overgrazing.

Beginning as long ago as the early 1880s, the French Administration, with the help of armed troops, demanded that farmers grow peanuts for the French vegetable oil industry. Peanut monoculture expanded rapidly after World Wars I and II and boomed again during the 1950s. Peasants needed cash to pay taxes imposed by the French and peanuts were the only source of francs. However, the cash crop also brought unexpected catastrophe. Today, around 40 per cent of Senegal's arable land is used for growing peanuts. Economic dependence on the export crop has led to excessive mono-cropping, soil degradation and forest clear-cutting.

The environmental impact of the peanut farming has been comprehensive. Small-scale farmers did not own animals, so manure was unavailable. A fallow period would have allowed nutrients to re-accumulate in the soil, but the people could not afford the time. Instead they grew peanuts till the soil was exhausted, then moved to new lands. They chopped down trees, which held topsoil in place and helped absorb infrequent rains. Before the peanut take-over, the roots and stalks of the millet crop used to be left in place, holding down the topsoil. But the peanut, on the other hand, is wrenched from the ground, the soil loosened and clouds of earth swirled away with the dry-season winds.

Under a logging concession, the Government and local communities would expect incomes from the concession holder through fees and royalties. This potential loss of income has to be compensated for by the new conservation agreement. Income for the Government is fed directly into its Forestry Division to manage and develop the Gola Forests for conservation. Local communities will receive royalties to put into conservation-friendly community development projects. The agreement will also guarantee employment and engagement of communities in the management of the forests. A trust fund will meet these costs in perpetuity.

## Will climate change break the herder's back?

### Niger and the story of Hamidou Oussemane<sup>21</sup>

Hamidou is a farmer from the village of Guidan Ali in the district of Birnin Konni. His extended family comprises 40 people.

Climate uncertainty is a way of life for Hamidou. As a young child he remembers the good times when the rains were abundant and more reliable than they are today. But since the drought years of the 1970s and 1980s, the rains have never been consistent from one year to the next. Adapting to unpredictable and erratic conditions has not been easy, but over time Hamidou has developed a farming system on which he has raised a family while managing to help others.

The family's livelihood is based on a mixture of farming, livestock keeping, and the selling of fuelwood. The family farms 10 fields covering about 26 hectares located on different soil types (sandy dunes, and low-lying clay areas) and producing a variety of food crops including millet, sorghum and rice, in order of importance. The women cultivate smaller plots on which they grow sorrel and okra. In a good year, the family produces a surplus, which is stocked in the family's granaries, although a small amount of rice may be sold from time to time. The family also looks after 61 cattle of which 41 belong to them. The other animals belong to neighbours and friends. Until 1982, the herd was taken in different seasons either north towards Tahoua, or south to northern Nigeria. But for a variety of reasons, including conflict and the rising costs of accessing pastures in the dry seasons, Hamidou's sons now look after the herd themselves in the vicinity of the village and it is used to manure the family's fields and those of other village members.

Livestock, manure, plentiful household labour, and access to the relatively well-watered clay soils at the base of the sandy hills have been the main ingredients behind Hamidou's success as a farmer. Although he has a large family to look after, he has a big farm by Sahelian standards with a broad mix of land types and soils. In an average year he is able to harvest sufficient food to feed the whole family and put aside for future years. Since he doesn't need to sell animals or milk to buy grain, the herd is able to grow relatively fast. Hamidou's system is an example of the benefits of an integrated crop-livestock farming approach widely promoted by policy-makers in the Sahel.

However, it is a system that is highly vulnerable in the context of increasing climatic uncertainty and greater rainfall fluctuations. Global warming introduces extra tension into an already stressed way of life that could make a critical and negative difference. Over the last 20–30 years, Hamidou has become more and more 'sedentary'. He no longer takes his animals to more distant pastures and he has lost the contacts he used to have with families in other areas of Niger and Nigeria.

His farming system is heavily dependent on manure. In the event of a serious drought or a series of below-average years, Hamidou may find it difficult to save his animals as he has no obvious 'refuge area' and local pastures are increasingly rare due to the pressure of cultivation. The locust plague of 2004 added an extra burden on many farmers in Niger; aid agencies are warning that 2005 will be very difficult.

The loss of the herd would undermine Hamidou's farming system and livelihood. Livestock routes are blocked, the institutions managing access to resources are 'corrupted', and there is increasing competition over local resources.

His plans now are to diversify into other areas of economic activity, which are less dependent on the rains. Already two of his sons regularly go to Nigeria in the dry season to earn money as labourers. His nephews too earn money in this way and are planning to set up a small restaurant business in a nearby town. Hamidou is also thinking about buying land in a nearby irrigation scheme. He says he will wait to see what the future brings and whether God will answer his prayers for more rain.

### Ethiopia and support for smallholder agriculture<sup>22</sup>

Many of the approaches that constitute 'good development' also double as excellent techniques to adapt to the uncertainties of global warming. Smallholder farming in Ethiopia is a case in point. Ethiopia is crippled by unfavourable international trade rules, lack of rural roads and market access, unemployment, debt, and environmental degradation. Ten per cent of Ethiopia's annual income still goes on debt repayments – twice what it spends on healthcare each year and three million people have contracted the HIV virus. So, when the rains fail in Ethiopia there is nothing to fall back on.

The Ethiopian Orthodox Church, which works with the agency Christian Aid, is addressing these issues through its Rural Integrated Development Programme in Bugna, in the Amhara region of northern Ethiopia. Project co-ordinator Deacon Abate Desale says, "The land is so degraded in this region that erosion causes floods when the rains come and drought when it does not. Most Ethiopians are dependent on the land for their livelihoods so we must invest in it." Techniques, such as terracing land on hillsides to stop erosion and collect water for irrigation, replanting trees, and protecting areas of land for regeneration, are all effective long-term measures to prevent drought leading to famine in the future.

The programme shows Ethiopia's potential. In the middle of the dry, unproductive landscape lies an oasis of lush, green vegetation and bird song. This 'garden of Eden' is designed to teach neighbouring farmers how to successfully grow vegetables and trees with traditional organic methods, enabling them to earn an income and have a more balanced diet. Vegetables, such as carrots, lettuces, tomatoes and onions, rarely seen in rural Ethiopia, are intercropped with a variety

## The Churches and climate change<sup>23</sup>

“When I was a child, there was so much rain that we prayed for it to stop. Now we pray for rain.” The Catholic archbishop of Bulawayo in Zimbabwe, Pius Ncube, says that local people over 50 years of age have noticed much less rain in Matabeleland than there was 30 years ago. “There has been a big climate change within living memory”, he reports “and the rainy season, which used to run from October to April, now starts around mid-November and ends in February.” Yet, he adds, “We have so many immediate crises in our country – starvation, poverty, AIDS, human rights abuses – that environmental issues such as water shortages, the random chopping of trees for fuel and the diminishing wildlife are not really being addressed.” In neighbouring Zambia, the Catholic bishops issued a letter in 2004 deploring that, “We have not taken the best care for this environment on which we depend for our survival.” The letter identifies “massive deforestation” as a key problem and blames it on the ever-increasing need for fuel wood. The bishops say that lack of access to electricity in poor communities has encouraged charcoal burning. In South Africa, the Church has begun awareness-raising work on the issue of energy, particularly encouraging the development of renewable energy such as solar and hydro. More than 70 per cent of total energy consumption in South Africa comes from coal – a highly carbon-intensive fossil fuel. Local ecumenical groups in South Africa, such as the Diakonia Council of Churches in Durban, are incorporating climate change into their bible study materials, which link scripture with the realities facing modern society.

Two Protestant church leaders have warned of the dangers of climate change triggering disasters in Africa. In December 2004, Rev. Ishmael Noko, from Zimbabwe and head of the Lutheran World Federation, said the tsunami disaster that month was a warning of the vulnerability of low-lying coastal areas to rising sea levels caused by global warming. “It is a reminder that we would do well to heed, at a time when even the relatively inadequate efforts by the international community to address climate change continue to be subverted and undermined by some of those most responsible,” Noko said. His concerns were shared by Rev. Dr Sam Kobia, a Kenyan Methodist and the head of the World Council of Churches, who called on powerful nations that had not signed the Kyoto Protocol on greenhouse gas emissions, to do so. In October 2004, at the Coventry launch of Operation Noah, the British churches’ climate change campaign, a plea was read out from Africa asking for the help of faith-based groups in securing equity for Africa in the world’s response to climate change. In a letter to conference delegates, Grace Akumu, Co-ordinator of the Nairobi-based Climate Network Africa, reported that, “Frequent flooding and droughts leading to famines and deaths, destruction of infrastructure, economic and livelihood ruins, are now a

common feature in Africa with some countries experiencing these impacts even twice a year.” She added: “At this faith-based groups’ meeting, we appeal to your conscience to support the concept of Contraction and Convergence as it is not only ethical and moral, but it provides the avenue through which all countries can participate in restoring the ecological and climate change imbalance in an equitable manner. Africa has suffered enough in human history, from slavery to colonialism and now our people are at the mercy of the unbridled economic development of the North.”

of seedlings, such as coffee and fruit trees. Farmers learn about organic pest control, irrigation and water conservation and are provided with seeds and tree seedlings to give them a head start.

Carbate Bazarba is one of 400 farmers currently benefiting from this project. Like most Ethiopian farmers, Carbate used to grow cereals only. “The greatest thing I have learnt from the demonstration site is how to plant new crops like fruits and vegetables and how important these things are for our diet. Now my wife and children have a better diet and I earn money from selling vegetables. My only problem now is that my children prefer guava and papaya and won’t eat their injera!” Injera is an Ethiopian staple meal – a large flat pancake made from teff, the Ethiopian grain.

## Climate change and locust plague in the Sahel<sup>24</sup>

During 2004, several West African countries fell victim to the largest locust invasion in 15 years.<sup>25</sup> Millions of hectares of crops and pasture were destroyed by giant swarms of insects.<sup>26</sup> Production, especially of food crops, decreased drastically to reach 8,978,142 tonnes against a minimum need of 10,234,193 tonnes in the Sahel.<sup>27</sup> The locust plague that began in summer 2004 undermines poor people's livelihoods as 80 per cent of the population depends on seasonal staple-food production to feed themselves. West Africa is not the only region vulnerable to locust invasion. There are three main areas where locusts reproduce: in the Sahel and Maghreb; around the Red Sea; and along the Indian and Pakistani border. The area covers about 16 million km<sup>2</sup> and includes some 30 countries.

Widespread and heavy locust infestations occur in periods of one or more years. A plague can occur when favorable breeding conditions are present (which will be affected by climate change) and when control operations fail to stop a series of local outbreaks from developing into an upsurge that cannot be contained, mostly due to poor preparedness. There have been 6 major plagues of Desert Locusts in the 1900s, one of which lasted almost 13 years. These can cover an area of about 29 million km<sup>2</sup>, and can extend across 57 countries.

Plagues occur in relation to locust biology.<sup>28</sup> Vegetation, soil structure and habitat all affect their behaviour, all of which, in turn, are influenced by temperature and rainfall. Most climate change models predict an overall decline in rainfall, and within that, greater extremes of weather conditions, from droughts to inundations. Heavy rains create ideal conditions for locust reproduction. A combination of rain, vegetation and humidity leads to rapid breeding.<sup>29</sup>

Over the past decades, Africa has experienced important changes in rainfall patterns due to sea surface temperature changes, inducing both desertification, and the higher temperatures that could influence locust plagues.<sup>30</sup>

The Sahel has neither the means – in terms of equipment, products and logistics – nor the finances to avoid such disasters, much less stop the locust invasion from heading north towards the Maghreb. An invasion occurring during harvest will cause a major disaster that will lead to famine if the risk of residual eggs is not addressed. Economic impact can be reduced if farmers react quickly and save their crops before an invasion. But the ability to react quickly is not great so any damages will be huge.

The key to reducing impact lies in the response of governments of countries of neighbouring the Sahara. But that means securing financial support. Without money and the support of the International community it will be difficult to address the problem.<sup>31</sup> When poorer nations are using up to half of their revenues to pay debts it does not leave much room for any poverty-reduction measures or for action to be taken to alleviate the catastrophic consequences of locust plague.

As for a technological solution to the plague problem, history has shown that it has never been possible to stop a plague of locusts using pesticides once the plague has developed. Natural forces always stop the plague, which means that dealing with a locust plague requires social, not technological, measures. Communities need to be trained equipped and prepared at all levels for them to adapt to this new situation.

Aid agencies are extremely concerned at a mounting food crisis in Mali and Niger this year, with reports coming in of severe malnutrition among children in pastoralist communities in both countries. The causes are partly to do with drought and partly with last year's locust invasions. Major relief assistance is likely to be needed.

# Water, drought and the changing rains

Africa is already persistently affected by drought. Local droughts occur every year and continental crises seem to occur once a decade, or more recently, twice a decade. Although the continent uses only around four per cent of its renewable freshwater resources, “Water is becoming one of the most critical natural resource issues.”<sup>32</sup>

Currently around two-thirds of the rural population and one-quarter of the urban population lack access to safe drinking water, and the number of people suffering from water stress or scarcity is rapidly increasing as a result of urbanisation, increased economic development and population growth.<sup>33</sup> According to the United Nations Environment Programme (UNEP) currently, “14 countries in Africa are subject to water stress or water scarcity,” and “a further 11 countries will join them in the next 25 years”.<sup>34</sup> Between 1970 and 1995, Africa experienced a 2.8 times decrease in water availability.<sup>35</sup>

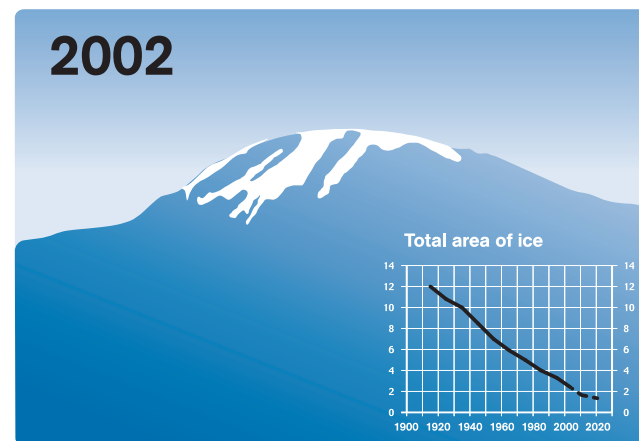
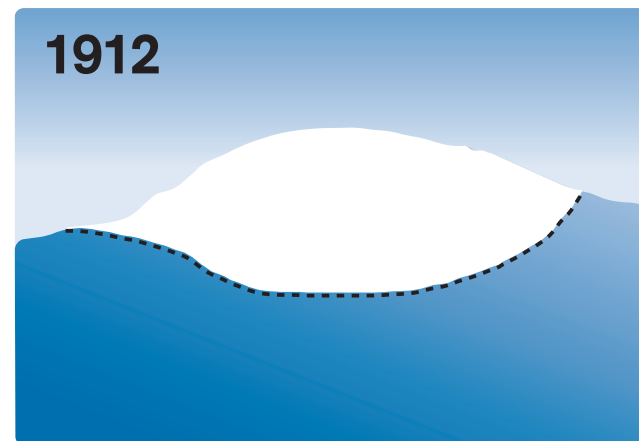
Africa’s coastal area already experiences the environmental problems of coastal erosion, flooding, and subsidence. Exploitation of coastal resources, development and population pressures are all involved. Climate change is expected to intensify these problems. The IPCC predicts, “Climate change will exacerbate existing physical, ecological/biological, and socio-economic stresses on the African coastal zone.”<sup>36</sup> With Africa’s overwhelming dependence on rain-fed agriculture, the fate of its people is exceptionally sensitive to disruptions in the hydrological cycle.<sup>37</sup>

## Expected impacts

Climate change is expected to intensify Africa’s increasingly critical water situation, with southern Africa being one of many water-stressed regions which could see a further decrease in the flow of streams flow and the ability of groundwater to ‘recharge’.<sup>38</sup> Reduced annual average rainfall and its run-off would worsen desertification in southern Africa.<sup>39</sup>

Africa, like everywhere else, relies on water for its social, economic and environmental well-being. But the fact that so many have subsistence livelihoods means that prolonged drought represents a serious climate related hazard for the continent. Take just one example of the domino effect that the symptoms of global warming could have. First there is a drop in water level in reservoirs or rivers in areas where rainfall drops. Then the quality of water goes down because sewage and industrial effluents become more concentrated, thereby exacerbating water-borne diseases and reducing the quality and quantity of fresh water available for domestic use.

## The melting snows of Kilimanjaro



(Sources: Meeting of the American Association of the Advancement of Sciences (AAAS) February 2001; Earthobservatory.nasa.gov)

In the Nile region, most scenarios estimate a decrease in river flow of up to more than 75 per cent by the year 2100. This would have significant impacts on agriculture, as a reduction in the annual flow of the Nile above 20 per cent will interrupt normal irrigation.<sup>40</sup> Such a situation could cause conflict because the current allocation of water, negotiated during periods of higher flow, would become untenable. Although the IPCC states that the “potential effect of climate change on drought in Africa is uncertain”, it also asserts that “It seems prudent to expect drought in Africa to continue to be a major climatic hazard”, observing that even a small decrease in precipitation combined with higher evapotranspiration could result in “significantly greater drought risks”.<sup>41</sup> Consequently, the IPCC recommends the improvement of water use and irrigation systems in Africa, which would, regardless benefit the region.

## Living with climate variability and uncertainty in southern Africa

*“Seasons have been irregular in certain regions and there are no precise times for planting as there used to be. Crop yield has reduced drastically, sometimes resulting in total crop failure, and high yielding variety crops are no longer grown. There is no longer food security which results in high food prices, malnutrition, and poverty.”*

**Development group MOUCEORE, Rwanda**

From the level of the individual, to the community, and to the nation, people have had to cope with climate variability and climate change for centuries. So, in order to better understand how societies may adapt to future climate change, it is necessary to understand human behaviour and decision-making as well as climate science. The Adaptive research project investigated farmers’ perceptions of, and responses to, changes in the summer rainfall area of South Africa.<sup>42</sup>

For farmers in South Africa, the concepts of ‘drought’ or ‘extreme rainfall’ are not necessarily sufficient to capture the dynamics of climate variability. Factors such as: the *timing* of the onset of first rains (which affects when crops are planted), the *distribution* of rainfalls within the growing season, and the *effectiveness* of the rains, are all real criteria that affect the success of farming. Therefore better drought forecasting *per se* may not be enough to help people cope with climate uncertainty and change.

Individual people in the case study areas showed an acute awareness of the changing climate trends around them. Where repeated exposure to an event has occurred, such as drought in Mantsie, familiarity and experience mean it can be viewed very differently from other ‘surprise’ events (like flooding), which occur less often. As one farmer said:

*“Drought is easier to cope with because we are used to it, the heavy rains are not good because we need a little and often.”*

**Table 1: Climate characteristics for the three study areas in South Africa**

<b>Climate parameter</b>	<b> Limpopo Province (northern area)</b>	<b> NW Province (west of Mafikeng)</b>	<b> KwaZulu Natal (eastern area of the northwest of the province)</b>
	<b> Case study village: MANTSIE</b>	<b> Case study village: KHOMELE</b>	<b> Case study village: eMCITSHENI</b>
<b>Long-term mean annual rainfall</b>	400–500mm	500-600mm	800-900mm
<b>Onset of season characteristics</b>	Growing length of dry season, later start to wet season in October to early November	Early wet season rain days have been increasing (Sept-Oct)	Highly variable and increasingly uncertain. Increase in early season rains with parallel decline in late season rains (Feb-March) for some years.
<b>Within season characteristics</b>	Within wet season a trend towards fewer rain days in Nov and Dec and an increase in overall occurrence of dry spells	Variability in rainfall amounts and distribution with no specific wetting or drying trends identifiable	Higher rainfall in first half of growing season, characteristically heavier rainfall events with lower rainfall events later in the season.
<b>Drought frequency</b>	Frequent in the last two decades: 1982-3, 1987, 1990 and 1994	Regular over the last 50 years	No trend

And climate really matters. Amongst all the disturbances that affect African societies today, including the impact of HIV/AIDS and political disturbances, local people say climate change is significant.

The Adaptive work identified differing types of response to climate variability and change, outlined in Table 2. The strategies are either means of simply getting by, or *coping*, or represent real forms of *adaptation* to the changes in rainfall. Some of these responses, such as diversifying livelihoods, are not unique to climatic upheaval, but importantly were clearly identified by rural people themselves in this study as *deliberate* responses to climate triggers. The following definitions of what is ‘coping’ and what is ‘adapting’ also come from the people themselves.



**Table 2: Impacts of, and responses to, locally identified climate parameters in the study villages**

## Mantsie

<b>Parameters identified by focus group</b>	<b>Perceived impact</b>	<b>Range of responses – rapid (coping) and longer-term (adaptation)</b>
Little rain	<i>On welfare of household</i>	<i>Change a farming practice – coping</i>
Breaks in rainy season	<ul style="list-style-type: none"> <li>● Hunger</li> <li>● Demands from family and friends for food</li> <li>● Sickness and tiredness</li> </ul>	<ul style="list-style-type: none"> <li>● Buy salt</li> <li>● Store fodder</li> <li>● Go to town to buy more seeds</li> </ul>
	<i>On natural resource-based livelihoods</i>	<i>Spatial/temporal diversity – adapting</i>
	<ul style="list-style-type: none"> <li>● Crops die</li> <li>● Loss of seeds</li> <li>● Less fodder for animals to eat</li> <li>● Debt (money owed from ploughing)</li> <li>● Young animals die</li> <li>● Less grass</li> </ul>	<ul style="list-style-type: none"> <li>● Eat wild fruits</li> <li>● Look at plants and birds to decide what can be planted when and where</li> <li>● Buy short-maturing crop varieties</li> <li>● Take small stock to river area or other villages</li> </ul>
		<i>Commercialising – adapting</i>
		<ul style="list-style-type: none"> <li>● Sell your animals</li> <li>● Try to start a business</li> <li>● Travel to town to find work</li> </ul>
		<i>Networks – coping and adapting</i>
		<ul style="list-style-type: none"> <li>● Send someone from the community to ask the Government what they will do to help</li> <li>● Go to church</li> <li>● Ask family elsewhere to help</li> <li>● Collect your welfare payments/food</li> <li>● Steal</li> </ul>

## Khomele

<b>Parameters identified by focus group</b>	<b>Perceived impact</b>	<b>Range of responses – rapid (coping) and longer-term (adaptation)</b>
Less rain	<i>On welfare of household</i>	<i>Change a farming practice – coping</i>
Period of no rain	<ul style="list-style-type: none"> <li>● Tiredness and hunger</li> </ul>	<ul style="list-style-type: none"> <li>● Grind maize stalks as feed</li> <li>● Use resistant yellow maize</li> <li>● Plant late-maturing fruit trees</li> </ul>
Unpredictable rain	<i>On natural resource-based livelihoods</i>	<i>Spatial/temp diversity-adapting</i>
Rain out of season	<ul style="list-style-type: none"> <li>● Seeds do not germinate</li> </ul>	<ul style="list-style-type: none"> <li>● Use irrigated land</li> <li>● Eat wild fruits</li> <li>● Work land in other places</li> <li>● Cut fodder from ironwood trees and collect seeds from wild plants</li> </ul>
Late rain	<ul style="list-style-type: none"> <li>● Makes soil more unproductive</li> <li>● Affects planning – cannot tell the rainfall patterns by flowers on wild plants</li> <li>● Poor quality grass</li> <li>● Livestock die</li> <li>● Dryland crops die</li> <li>● Pests proliferate</li> <li>● Leaves change colour</li> <li>● Less water for animals</li> <li>● More thorn bushes</li> </ul>	<i>Commercialising –adapting</i>
		<ul style="list-style-type: none"> <li>● Gardening projects to improve food security</li> <li>● Form groups to start new business venture</li> <li>● Sell livestock, esp. at auction</li> <li>● Look for piece work</li> <li>● Plant winter crops</li> <li>● Plant late-maturing fruit trees</li> <li>● Breed indigenous species</li> </ul>
		<i>Networks- coping and adapting</i>
		<ul style="list-style-type: none"> <li>● Ask for money from relatives</li> <li>● Get help from government e.g. subsidised feed</li> <li>● Have village meeting</li> <li>● Local leasers decide what to do</li> <li>● Advice from church</li> <li>● Get medicines</li> </ul>

Table 2 (Contd)

## eMcitsheni

Parameters identified by focus group	Perceived impact	Range of responses – rapid (coping) and longer-term (adaptation)
Changing seasons	On natural resource-based livelihoods	Change a farming practice – coping <ul style="list-style-type: none"> <li>● Store fodder</li> <li>● Build cattle shelter</li> </ul>
Hail	<ul style="list-style-type: none"> <li>● No feed for animals</li> </ul>	Spatial/temp diversity-adapting
Drought	<ul style="list-style-type: none"> <li>● Makes soil more unproductive</li> </ul>	<ul style="list-style-type: none"> <li>● Change type of vegetable or maize type</li> </ul>
Frost	<ul style="list-style-type: none"> <li>● Animals die</li> </ul>	Commercialising – adapting
Heavy rain	<ul style="list-style-type: none"> <li>● Can't afford to buy good seeds</li> <li>● Can't sell crops</li> <li>● Lack money (no crop/livestock sales)</li> </ul>	<ul style="list-style-type: none"> <li>● Change type of vegetable or maize type (related to sale opportunities)</li> <li>● Plant vegetables</li> <li>● Sell livestock or goods</li> <li>● Start projects</li> <li>● Find work</li> </ul>
Snow	<ul style="list-style-type: none"> <li>● No money for transport</li> <li>● Crops die</li> </ul>	Networks- coping and adapting <ul style="list-style-type: none"> <li>● Borrow from family</li> <li>● Apply for government grant</li> <li>● Have village meeting</li> <li>● Pray at church</li> <li>● Ask extension officer for information</li> </ul>

The Adaptive project also found that some forms of response were occurring in all three areas. Commercialising small-scale agricultural production was important in all areas, creating a source of cash that can then be used flexibly to meet household needs.

The findings illustrate that concerns about the effects of climate change on rural societies are justified: climate change is happening, and it is affecting activities that depend on the natural environment.



Photo: Jim Loring/Tearfund

*“The change in weather has affected agriculture to the extent that some vegetables don’t now grow and we yield less vegetables per hectare. Also, there are more plant attacks by insects than before.”*

**Pastor Elie Kabore, Burkina Faso**

However, far from being passive victims, people recognise even subtle changes in climate, and take steps to respond to them.

Some of these responses may be positively beneficial; some though, may be harmful, in the short or long term. Either way, people are making significant changes in their lives. Inevitably, there will be winners and losers in the process. Some people will adapt more successfully than others, and it may be that climate change will result in a polarisation of wealth and well-being in ways we have not seen before.

### Rainwater harvesting in Gwanda District of Zimbabwe<sup>43</sup>

Communal lands in Zimbabwe are often in areas that are marginal for producing food. Soils are poor and rainfall low. The Intermediate Technology Development Group (ITDG) has worked on the communal lands for 20 years, developing an approach to mobilising communities called Training for Transformation. The work on rainwater harvesting evolved to meet the communities’ need to increase food production in a climate where people think that rainfall is reducing and becoming more unpredictable.



*Contour ridge and infiltration pit under construction*

Mrs Magaye, village co-ordinator of the agricultural production system in Humbane village in Ward 17 Gwanda North, describes the experience of incorporating rainwater harvesting.

*“The first thing we did was to visit some farmers to learn from them. We went to Zvishavane and Chivi. We liked what we saw and when we came back, we called a ward meeting, so we could share our experience. Traditional leaders in the ward came together. We reviewed the challenges we are facing here and came up with a strategy. Our main challenges are food security and environmental degradation in open access areas. The first strategy was rainwater harvesting instead of allowing the water to run off. So farmers began digging contours. We got training from ITDG in pegging contours (using the A frame.) It is an affordable technology.*

*We realised if we just dug a contour, the water would overwhelm it, so we dug infiltration pits, to slow it down. Then we ploughed and sowed. Tilling the land was hard, because of a lack of donkeys and ploughs. In the dry season, donkeys don't have enough grass to eat and are weak. We approached the District Development Fund to ask to hire tractors. The cost is too high for most villages. We were able to pay enough to cover half a hectare for each farmer. Another challenge was how to help the elderly to work? Due to HIV/AIDS and migration of the area, there is a shortage of*

*able-bodied labour. So grandchildren took the place of elders. If an elderly person had no younger relative, others would dig on their behalf. The elderly can help, by praying, giving advice, and baby minding. We work together as a social responsibility to elders.”*

Before the project, there had been no harvest, while last season, quite a few households harvested 500kg of maize. Twenty-five per cent of households in 2003 had produced enough food to see them through the year. Many of the other 75 per cent had joined the project later, or only committed part of their land to contour ridging, waiting to see how others fared.

Health is often neglected in the assessment of vulnerability and adaptation to climate change. However, methods have been developed for assessing the impacts of climate variability and change on a range of health outcomes.<sup>44</sup>

Systematic health assessments are needed to inform the management of everything from water, to food, housing and trade. Several developed and developing countries have already conducted national assessments to determine their vulnerability to the impacts of climate change and evaluate the capacity of their health infrastructures to adapt. In the summer of 2003, an estimated 11,435 people above the seasonal average died in France when a record-breaking heatwave struck in the first two weeks of August. Responding, Health Minister Jean-François Mattei, announced \$748 million in extra funding for hospital emergency services, a measure that would either be impossible or stretch to breaking point government budgets in much of Africa.<sup>45</sup>

The range of potential problems sensitive to climate change is enormous:

- Heat stress (the direct effect of the thermal environment on health).
- Air pollution (outdoor air quality).
- Weather disasters (such as floods, windstorms).
- Vector-borne diseases (such as malaria, dengue, schistosomiasis and tick-borne diseases).
- Water-borne and food-borne diseases (such as diarrhoeal diseases).
- Stratospheric ozone depletion (not a direct element of climate change, but a matter of concern).
- Food security.
- Demographic changes that shift the balance of vulnerable populations demanding different health services.

In spite of its relative neglect as an issue, since the first IPCC report in 1990, there has been a steady improvement in the understanding of the impacts of climate change on health. The World Health Organisation (WHO) estimated that globally, for the year 2000, there were 150,000 deaths and the loss of 5.5 million 'disability-adjusted life years', (a standard WHO measure to compare disease burdens) caused by climate change.

In its report, *Climate change and human health*, the WHO shows that changes in the patterns for the spread of infectious diseases are a likely major consequence of climate change.<sup>46</sup> The report indicates likely increases in mosquito populations which spread viral diseases such as dengue and yellow fever, and points to the positive correlation between the annual number of dengue epidemics in the South Pacific with the warm wet conditions of La Niña,<sup>47</sup> and the seasonal variation in many diarrhoeal diseases suggesting sensitivity to climate.

The most recent IPCC report, *Climate change 2001: impacts, adaptation, and vulnerability*, is unequivocal: climate change will have the biggest impact on the communities least able to respond to it. "The impacts of climate change will fall disproportionately upon developing countries and the poor persons within all countries, thereby exacerbate inequities in health status and access to adequate food, clean water and other resources."<sup>48</sup> These communities are also the least responsible for damage to the climate. Poor communities in Africa are likely to be the most vulnerable.

Africa's high vulnerability to the impacts of climate change is compounded by widespread poverty. Ongoing drought and floods, and a dependence on natural resources for rural livelihoods, in turn, exacerbate the increased vulnerability. Also, Sub-Saharan Africa already supports a heavy disease burden including HIV/AIDS and malaria, cholera, dengue fever, yellow fever, encephalitis and haemorrhagic fever.<sup>49</sup>

## Malaria – a special case

*"Mosquitoes are spreading into highland areas that were historically free from malaria. There is also an increase in water-borne diseases."*

**Tadesse Dadi, Ethiopia**

Beyond its role in the continent's already serious disease burden, malaria represents a particular and additional threat in Africa. There are between 300 and 500 million cases of malaria annually in the world each year with a very high proportion of those occurring in Africa – largely among the poor. Malaria causes between 1.5 and 2.7 million deaths, of which more than 90 per cent are children under 5 years of age. In addition, malaria slows economic growth in Africa by up to 1.3 per cent each year.<sup>50</sup>

Climate change is almost certain to make an already bad situation worse, and may be already contributing to the problem. There is increasing evidence that



Photo: Jim Loring/Tearfund

climate change plays a significant role. In one highland area of Rwanda, for example, malaria incidence increased by 337 per cent in 1987, and 80 per cent of the increase could be explained by changes in rainfall and temperature. It is expected that small further changes in temperature and precipitation could trigger malaria epidemics at the current limits of the disease both in altitude and latitude.

Global warming will increase the incidence of floods, warming and drought all of which are factors in disease transmission. In South Africa, it is estimated that the area suitable for malaria will double and that 7.2 million people will be at risk – an increase of 5.2 million.<sup>51</sup>

In addition, flooding – which is likely to increase as the climate changes – could facilitate breeding of mosquitoes, and as a result spread malaria to otherwise dry areas. The Sahel region, which has suffered from drought in the past 30 years, has experienced a reduction in malaria transmission as a result. If flooding does occur, there is a renewed risk of a malaria epidemic.<sup>52</sup>

Recent studies also show that it is not just an increase in average temperatures and rainfall that trigger epidemics in areas previously free of malaria, but greater climatic

variability can introduce the disease to areas previously free of malaria. Populations within these areas lack immunity and increase the impact of the illness.<sup>53</sup>

Climate change will have a dramatic impact not just on the health of vulnerable communities in Africa, but also on the ability of those communities to respond to the changing conditions. Any response to this crisis must include support for adaptation to the climate change that cannot be avoided, as well as investment in livelihoods and technologies that will both improve quality of life and mitigate further damage to the climate.

Rarely considered, though, is the knock-on effect of these impacts on poor and vulnerable communities. What will be the impact of an increased disease burden on an already-stressed healthcare infrastructure? What will be the impact of that increasing disease burden on educational provision when both economic capacity and the pool of prospective teachers (and potential students) are diminished? What will be the impact on the ability of people to work the land, or even rebuild communities after climate driven disasters? Climate change will not only affect people's health in all the ways described, but in doing so it will also hamper people's ability to adapt to a changing, uncertain climate.

Africa has enormous potential for renewable energy and energy-efficiency technologies. Energy resources, such as biomass, geothermal and hydropower, are abundant. On the other hand, the vast majority of African people have no access to clean, modern energy. There is a huge market and human demand for sustainable energy, especially in the poorer communities. These resources and technologies, however, remain largely unexploited due to financial, capacity, market and political barriers.

Almost half of Africa's countries could profitably produce hydropower, but only a fraction of that potential has been reached to date because of poor infrastructure and high costs of initial investments. The continent accounts for only 1.3 per cent of the world's solar energy facilities, and only 4 of its 53 countries have started exploring underground heat sources.<sup>54</sup> At the same time, a huge proportion of the population is surviving without power or clean fuels. Over three-quarters of Sub-Saharan Africans have no access to electricity, compared to fewer than 14 per cent of people living in Latin America and East Asia.<sup>55</sup> Most of Sub-Saharan Africa depends on biomass fuels taken from wood and agricultural waste. Families in rural and semi-rural areas are left little choice but to increasingly exploit fragile ecosystems to meet their energy needs, ultimately undermining both the fuel source upon which they depend and the rich diversity of plants and animals that live there.

The challenge is how to create access to clean, affordable energy sources, which allow Africa to avoid the 'dirty' energy path that others have gone down, while meeting real development needs. These energy options also offer employment and economic development opportunities and help liberate countries from the energy ball-and-chain of oil-dependency.

Various initiatives have been established to support sustainable energy, including the Johannesburg Renewable Energy Coalition (JREC) and the Renewable Energy and Energy Efficiency Partnership (REEEP). Two others are the European Union Energy Initiative and the Global Village Energy Partnership and there is a current proposal to set up an EU Energy Facility for Africa worth €250 million. However, a coherent strategy needs to be developed by leading industrialised countries to re-orient global investment away from fossil-fuel-intensive energy infrastructure and into low-carbon and carbon-neutral technologies, which can power poverty reduction. As recently as 2003, fossil fuel projects represented 86 per cent of the World Bank's spending on energy, compared to funding for renewables at just 14 per cent.<sup>56</sup> It's necessary now to ensure that sustainable energy initiatives result in measurable commitments, be better integrated and far better resourced.

These considerations would apply to all the initiatives listed above, and the outcomes of Renewables 2004, the World Bank's Extractive Industries Review (EIR) and the G8 Renewables Task Force.

The G8 countries, at the very least, should work with African and other developing countries to promote a meaningful follow-up process to the Renewables 2004 conference to ensure that technology transfer and development approaches are better co-ordinated, and that voluntary commitments made at the Bonn renewable energy conference are implemented. At present, the credibility of these programs in delivering meaningful outcomes is open to question.<sup>57</sup> Worse than that, the face of the fossil fuel industries in Africa is smeared with exploitation, pollution and bad development practice.

African people want greater access to energy. The continent has abundant natural resources but these are often either under-used, badly exploited or exported to richer countries. Africa needs the means to develop local solutions using local resources to meet local needs, and increased access to clean, sustainable energy to support health and education services, households and enterprise.

## **Feeling the heat: gas flaring in Nigeria<sup>58</sup>**

Nigeria is the world's largest gas flarer and Nigerian flaring has contributed more greenhouse gases than all other Sub-Saharan sources combined. And, despite national and international condemnation, the practice of flaring gas in the Niger Delta remains widespread. It has been carried out on a massive scale in Nigeria for nearly 50 years, violating the rights of local populations, not least the right to health and the right to a healthy environment. Flames and fumes are produced 24 hours a day, seven days a week, year after year, affecting people's health, polluting the local environment and destroying livelihoods. Nowhere else in the world are communities subjected to it on such a large scale.

In the mid-1990s, daily oil production in Nigeria amounted to approximately two million barrels. In the region of 17 billion m<sup>3</sup> of associated natural gas was estimated to be flared annually, generating an estimated 2,700 tons of particulates, 160 tons of sulphur oxides, 5,400 tons of carbon monoxide, 12 million tons of methane, and 3.5 million tons of carbon dioxide. Because of poor regulatory framework, Nigeria flares 75 per cent of the gas it produces. In absolute terms, this is the highest amount in any OPEC member nation and accounts for about 19 per cent of the total amount flared globally. Information on the amount of associated gas currently flared can be contradictory as well as difficult to obtain.

The flares contain widely recognised toxins, such as benzene, and carcinogens, such as dioxin. Particles from the flares fill the air, covering everything with a fine level of soot.

Exposed to this cocktail of toxins, local people, who live and work alongside the flares with no protection, complain of respiratory problems, such as asthma and bronchitis, and of the distress caused by the constant roaring noise and the intense heat from the flares. Assessments made in the vicinity of Izombe Flow station, one of the numerous oil installations in the Niger Delta, showed that gas flaring had led to the complete destruction of crops within 200 meters from the station. The loss was 45 per cent at 600 meters and even as far as 1Km from the station, a 10 per cent loss in crop yields occurred. While a number of factors may contribute to declining crop yields, many villagers across the delta region believe that decreasing productivity is linked to the gas flaring, adding to their frustration with the oil companies.

Acid rain caused by the flaring is also reported to corrode roofs and buildings in the area. Neither the oil companies nor the Nigerian Government appear to have investigated the psychological and physical impact of the gas flaring on local communities. Nor have they provided local inhabitants with information on the hazards to which they are exposed.

Few Nigerians have benefited from the wealth generated by Nigeria's oil industry. Many of the riverine communities of the Delta live in poverty, without access to clean water, basic healthcare, electricity or education, due to a combination of factors including environmental despoliation. In addition to constant flaring, oil spills are common, frequently contaminating farmland, watercourses, and fish supplies.

Gas flaring is visible and damaging. It is also a terrible and expensive waste of resources costing Nigeria – where 70 per cent of people live on less than a dollar a day and commonly cook on open fires – an estimated \$2.5 billion annually in lost potential income. It is also preventable. In Western Europe, about 99 per cent of similar, so-called 'associated' gas is used or re-injected into the ground. The double standard has led to accusations of environmental racism directed at the oil companies.

The Nigerian Government's commitment to end flaring (reportedly by 2008) is ambiguous, reflected in otherwise lax environmental legislation and confusion over the supposed end date, initially reported to be 2004, subsequently deferred to 2008 and sometimes reported to be 2010. The multinational oil company, Shell, indicated in January 2005 that it might have difficulty in meeting the target blaming a number of factors including insecurity.



Photo: Jim Loring/Tearfund

Gas flaring not only affects the health and livelihoods of Delta inhabitants, it also contributes to climate change, thus affecting communities all over world. Gas flaring emits carbon dioxide. Venting of the gas without burning, a practice also often referred to as flaring, releases methane, the second main greenhouse gas. Together these gases contribute about 80 per cent of global warming problem.

### **Livelihoods piped away – the Chad-Cameroon pipeline<sup>59</sup>**

The Chad-Cameroon pipeline project, worth \$3.7 billion, is the biggest private investment in Sub-Saharan Africa today, as well as one of the most controversial. It involved the drilling of 300 oil wells in the Doba region in the south of Chad and the construction of a 1070Km pipeline to transport the oil from Chad through Cameroon to an offshore loading facility on the Atlantic Coast. Along the way, the pipeline passes through rainforest, Pygmy territories and major food- and cotton-producing areas.

Two of the companies originally involved, Shell and TotalFinalElf, dropped out of the consortium, reportedly partly due to local opposition and opposition from environmental groups. However, project leader ExxonMobil carried on with the project, and is supported by US-based Chevron and Malaysia's Petronas. The World Bank Group and European Investment Bank provided \$200 million and \$120 million respectively for the project, presenting the project as an opportunity for Chad to come out of its acute poverty while generating much-needed revenue for Cameroon.

But, by mid-2002 it was already clear that the project was piping great amounts of misery and devastation into the area. The World Bank's official project monitoring bodies, the International Advisory Group and the External Compliance Monitoring Group document many of the project's serious problems in some detail. Thousands of people have had their lands expropriated, crops and other plants destroyed, and water sources polluted without adequate compensation. Some victims have received no compensation whatsoever.

The pipeline cuts across sensitive and valuable ecosystems, particularly in Cameroon's coastal rainforest. Project-related upgrading of existing seasonal roads has led to logging and illegal poaching in otherwise inaccessible areas. The pipeline traverses several major rivers, and construction has already caused oil spills and polluted the water system.

The influx of a migrant work force, the exponential growth of prostitution, and the poor sanitary conditions have led to the spread of communicable diseases, including HIV/AIDS. According to the World Health Organisation, "...it appeared that in this project decisions were based largely on cost and profit considerations, giving only passing attention to environmental and social aspects, and little or no decision-making power to the affected populations."<sup>60</sup>

The World Bank continues to claim that the project is being implemented with community support and NGO input. In fact, Transparency International rated Chad the fourth, most corrupt country in the world in 2004, a fact that significantly hampers participation in decision-making. The Chadian human rights situation is also highly problematic; the Chad Government has still not investigated the massacres of hundreds of unarmed civilians that took place in 1997 and 1998 in the country's oil-producing region. It was revealed that the President of Chad used \$4.5 million of the signing bonus paid by the oil consortium to buy weapons, rather than investing in public health, education and vital infrastructure.

Since the official inauguration of the pipeline in October 2003, the situation in Chad has deteriorated further. The authorities prohibited a peaceful demonstration planned by human rights groups, and the Government, in violation of the constitution, closed the country's only independent radio station. In both 2001 and 2002, local groups in Chad and Cameroon filed claims with the World Bank's Inspection Panel, charging that the Bank had violated its own policies in the implementation of the project. The Panel confirmed numerous trespasses of its environmental assessment policy, and in the case of Chad, violations of its operational directives on poverty alleviation and economic evaluation. "The World Bank touts the Chad-Cameroon oil pipeline as a model project that will reduce poverty while compensating for environmental impacts. Practice has however demonstrated the failure of World Bank rhetoric to match reality," said Samuel Nguiffo of Friends of the Earth Cameroon. Now, instead of drawing lessons from the experience, additional oil exploration and development is already taking place in Chad.

A recent report implied that UK Government support for the oil industry was driven more by Foreign Office endeavours to secure energy demand than true sustainable development.<sup>61</sup> The World Bank's Extractive Industries Review concluded last year that the industry too often exacerbates poverty. But the key recommendation of the review to phase out funding of fossil fuel projects in a set timeframe was brushed aside by the Bank. Now it is time for a radical rethink in aid, development and energy.

### **Energy loss? The Commission for Africa's approach<sup>62</sup>**

The approach of Prime Minister Tony Blair's Commission for Africa to energy is concentrated on funding "larger power projects" rather than local access to energy or clean, renewable energy. The Commission supports hydro- and gas-powered energy as potential drivers of growth. Hydro resources in some African countries, notably the Democratic Republic of Congo, are noted to be huge, but largely unexploited. Mozambique, it comments, has become a major exporter of electricity. "Mega-projects" in the gas industry are planned in southern and West Africa. Work is already underway on the development of the Grand Inga hydropower project, supported by the Commission, with a new development company. This project





alone would absorb several billion dollars of investment and development funds. More than \$4 billion is earmarked for the first phase, the building of Inga-3 and transmission lines to southern Africa. To develop the full potential of Inga, 40,000 megawatts, would cost £50 billion,<sup>63</sup> focused on one high risk and highly contentious project.

But mega hydro- and gas-power schemes, together with grid expansion, puts all the energy eggs in one basket, soaking up the available aid and investment, leaving little to deliver access to energy services for the poorest. Large power projects also tend to rely on international technologies, consultants and contractors, meaning that the funds invested will leak out of Africa and very little capacity building will take place where the projects are built. Even so, the report itself states that it should “should avoid funding prestige projects that have so often turned into white elephants in the past”.

The Commission’s approach to clean energy is to hope that rich countries will develop new markets that eventually open to Africa. It misses, as a result, the huge potential for indigenous technology development. Yet there is great potential

for local manufacture of technologies used in other parts of the developing world – for example: micro-hydro, biogas, small-scale wind power, solar thermal water heaters, and so on – to meet local needs now. Investment is needed in African technology for African people. All of the Commission’s other priorities for Africa – such as agriculture, promoting local enterprise, and access to water – require appropriate clean energy services delivered in a way that is accessible and appropriate. Implementation of the Commission’s energy strategy, therefore, requires a bottom-up approach, built around people’s needs, rather than the current top-down strategy. Without new thinking, a huge opportunity for development could be lost.

### **Dilemmas and escape routes in the energy trap<sup>64</sup>**

Demand for energy, coupled with the lack of livelihood options in many parts of Africa, can force people in poverty to both destroy their own environment and health, and miss finding a clean energy development path.

Along almost any stretch of road in rural Malawi you will find bulging sacks of charcoal and neat stacks of firewood for sale. It is a cottage industry that provides one of the few opportunities for poor households to make a little money, but it is also environmentally unsustainable, and in the long term impoverishes everyone. “Charcoal production is a very serious issue, and is one of the major causes of deforestation in Malawi,” the director of the Government’s forestry department, Kenneth Nyasulu, said in January 2005. “The damage to trees is causing soil erosion, which in turn causes food insecurity because the fertile soil is lost.” Acknowledging the growing problem of deforestation, President Bingu wa Mutharika inaugurated a national tree-planting month in January 2005. Sustainable forest management will secure livelihoods in the long term. Until a major supply of renewables is widely available to poor communities, cleaner fossil fuels such as LPG, offers an affordable fuel for many people in Africa that removes pressure on the forests and reduces GHG emissions. Also, 96 per cent of Malawi’s 12 million population has no access to electricity – restricting what they can do at home or work – while alternative sources of income are needed for rural people.

### **Fuel efficient small stoves in Mozambique**

In neighbouring Mozambique, around 91 per cent of energy use depends on fuelwood and charcoal. When biomass – including firewood and charcoal – is used inefficiently, it produces high levels of smoke, which damage health within households and the environment. Efficient combustion can reduce the amount of wood needed and with improved ventilation reduce smoke emissions, both when the charcoal is produced and also when it gets used for fuel, in improved stoves.

An improved-efficiency stove, can produce a dramatic reduction in women’s workload in fetching fuelwood. Some designs, such as the rocket stove, can also dramatically reduce emissions.

Mozambique is rich in renewable energy resources. Some of Africa's great rivers flow through the country. In the mountains in the northern and eastern provinces, there are many sites suitable for micro-hydro, which is free of carbon or any other pollutants and can be community managed. Currently large hydropower in Mozambique is transmitted over great distances to South Africa, with little gain to the local people where the power is generated.

There is abundant sunshine. Solar energy powers photovoltaic cells for electrification. Solar stoves for cooking have potential for those households for whom the technology is appropriate.<sup>65</sup>

### Energy which doesn't cost the Earth<sup>66</sup>

Demand for indigenous tree species from Kenya's Kakamega Forest for timber, firewood, carving wood, charcoal production, and poles is so great that up to 100,000 m<sup>3</sup> of timber and charcoal may be illegally extracted every year. To preserve the forest, the Kakamega Integrated Conservation Project, in partnership with ITDG, has introduced firewood-saving stoves, which are acceptable and affordable to local communities. The people are made aware of the energy-saving opportunities through discussions, participatory technical training and demonstrations, exchange visits, and information. Local community entrepreneurs have also been trained to commercialise the energy stoves.

By the end of 2001, communities adjacent to the forest had installed nearly 4,000 fuelwood energy-saving stoves. A production unit for the stoves is in operation, managed by the local community. Ten fuelwood energy-saving stoves have been installed in schools, institutions, hotels and hospitals around Kakamega Forest. The Upesi stove is made of clay and fired in a kiln. The design allows it to burn agricultural residues, such as waste from sugar cane, as well as wood. It can halve the amount of fuelwood needed by a household, which reduces drudgery and improves the sustainability of fuelwood resources. It provides employment and reduces smoke and carbon emissions. ITDG also introduced a new design of kiln, which substantially reduced the fuel needed to make the stoves.

But these issues need comprehensive and systematic support. For example, International Financial Institutions could immediately target 20 per cent of energy sector lending and support towards renewable energy development and energy efficiency programmes. The international community could also call for one billion people to be provided with improved, clean stoves by 2015.<sup>67</sup>



*The Five Star Group, from the informal settlement of Epworth, on the fringes of Harare, with the stabilised soil blocks they have made (around 7,000 bricks).*

### Low-energy building materials: soil stabilised blocks

There are many examples of African solutions to the energy crisis that need support. In Kenya and Zimbabwe low-cost and low-energy building blocks are being made from stabilised soil.<sup>68</sup> Sun-dried, they can be made on or close to the building site, so no energy is used in transport. The other advantage is that the people engaged in production gain a livelihood, and can afford to build decent homes and community buildings. The technology is simple. Soil dug on-site, if suitable, is mixed with a small amount of cement. People are trained in soil-testing techniques to determine the best mix. Water is added and the mixture is placed in block press. The bricks require cement, which often has to be imported, so there is an external energy input cost. However, the bricks offer an alternative to locally made baked-earth bricks, which are fired over 2–3 days in kilns burning fuelwood; this local industry has contributed to deforestation and is inefficient in energy use. The approach has helped to provide legal affordable housing in low-income neighbourhoods because the stabilised soil blocks compete favourably on cost with commercially made clay bricks. The technology uses little water, and produces no waste.

African people want greater access to energy. The continent has abundant natural resources but these are often either under-used, badly exploited or exported to richer countries. Africa needs the means to develop local solutions using local resources to meet local needs, and increase access to clean, sustainable energy to support health and education services, households and enterprise.

# Disasters

*"Poverty... plays a big role in keeping people vulnerable to disasters. And in the same fashion, disasters keep the poor in poverty by consistently wiping out the few resources they have."*

**World Bank, 2000**

## **Development wasted: the great Mozambique flood disaster**<sup>69</sup>

As rescue helicopters flew them to the safety of high ground, survivors of Mozambique's devastating floods of February 2000 looked out over the huge inland sea which covered once-prime farming land. Villages lay covered by silt and vegetation, a train track disappeared either side of an elevated bridge, and cattle waded knee-deep in water or huddled on tiny islands. After landing in Chibuto, a slightly elevated town spared the worst of the floods, the displaced people were taken to camps run by aid agencies. There, a fuel shortage in the town meant that two large water tanks at the main camp sat unfilled and just two toilets served 3,500 people. But longer-term problems loomed large.

A third of the country's crops had been destroyed; in some areas the loss was total. Roads and railway lines were wiped out, entire villages had disappeared, and hundreds of thousands of people were made homeless. But perhaps, more than damage to infrastructure, it was the long-term damage to livelihoods that was most devastating. Estimates put the figure close to 350,000 lost jobs, undermining, through the impact on households, the livelihoods of up to 1.5 million people.<sup>70</sup>

Years of development work in Mozambique, a country still recovering from years of war, were washed away by these floods. The worst in living memory, they followed unusually heavy rains over southern Africa and tropical storms that accompanied cyclones Connie and Eline. The Mozambique Government estimated that £65.5 million would be needed for reconstruction, including for water and sanitation, food aid, medicine and healthcare, shelter and housing, seeds and tools.

In Britain, other European nations and the US, millions of pounds are invested in reducing the risks associated with floods, earthquakes and droughts. Yet very little of international aid budgets gets spent on helping poor communities to do the same. To illustrate this, six months before the Mozambique flood disaster, the Government appealed to the international community for US\$2.7 million to prepare for the impending crisis. It received less than half this amount. After the floods came, Mozambique received US\$100 million in emergency assistance and a further US\$450 million was pledged for rehabilitation.<sup>71</sup>

## **Living on the floodplain of the River Incomati**

*"I was first alerted to the danger by my son who had heard an urgent warning over the local radio station. But I refused to move, saying "Why should I go? I have been living here since 1937. This is the place where I was born. I'm not leaving!" So when the waters came in the middle of that night I was forced to flee my house and take refuge in a tree, where I was stranded with nothing to eat for four days. There were also many poisonous snakes in the tree as they had also climbed to escape the water. I saw many dead animals floating past. Eventually I was saved by helicopter and taken to a rescue centre."*

*"There was no food; we tried to make platforms in the trees for the children to sit on. Some people died, and some of the children fell into the water, only to be swept away. The adults could not swim after them – they had to sit and watch them float away."<sup>72</sup>*

## **Disaster risk reduction**

"Extreme climate events such as floods, strong winds, droughts and tidal waves" are the main threats to Africa from climate change according to the IPCC. Many African communities are already suffering from the effects of drought and increasingly unpredictable weather patterns.<sup>73</sup>

Enabling vulnerable communities to reduce the risks from climate-related disasters is crucial to positive development, a point not lost to African countries.

Mozambique's Action Plan for the Reduction of Absolute Poverty 2001–2005 states: "Natural disasters... constitute an obstacle to a definitive break with certain degrees and patterns of poverty. Therefore, measures aimed at managing these risks are of the utmost importance." The environment action plan of the New Partnership for Africa's Development (NEPAD) observes, "Natural disasters... cause considerable human suffering and economic damage in the continent." And, governments agreed at the World Conference on Disaster Reduction in January 2005 that "Disasters in Africa pose a major obstacle to the African continent's efforts to achieve sustainable development."<sup>74</sup>

Reducing vulnerability to today's climate through disaster risk reduction is an excellent method of building adaptive capacity for the future uncertainties of global warming.

## The ecology of disaster reduction

The 2001 *World Disasters Report* identified four themes key to helping countries recover from disasters:<sup>75</sup>

- 1 Investing in sustainable livelihoods increases the speed of recovery and reduces vulnerability of the poor to disasters. People's livelihoods are as important as physical defences.
- 2 Plugging the spending leaks by maximising local procurement ensures that post-disaster resources re-circulate within the local economy, rather than leaking out of it, and helps boost longer-term recovery.
- 3 Diversified local economies are best that maximise employment and respect economic, social and environmental priorities, and are more disaster resilient than agricultural or industrial monocultures.
- 4 The impacts of globalisation, in terms of trade and financial flows, as well as climate change, are draining the resources needed to deal with disasters from the least developed countries.

A lot can be learnt from the experience of places highly vulnerable to climate-driven disasters such as low-lying, small, island states. Understanding of how to reduce the impact of disasters is particularly advanced in the South Pacific region.<sup>76</sup> Research identified several factors as enhancing community ability to recover from 'natural' disasters. They include strong, extended family structures, strong local government, and building on traditional approaches to housing and farming. Economic diversity and financial mechanisms to spread losses were also vital (for example, insurance, disaster funds, community trust funds). A dynamic civil society is important along with good transport, communications, sanitation, good education and health services, coupled with disaster preparedness and emergency services.

Conversely the loss of such social and economic fabric hampers post-disaster recovery. A narrow economic base, over exploitation of natural resources, and loss of diversity provide the weakest foundations for recovery.<sup>77</sup>

In Africa, particular risk-reduction measures would include participatory vulnerability assessment, rainwater harvesting, grain banks, designing and improving evacuation routes and sites, famine and flood early warning systems, protecting community buildings in flood-prone areas, and community disaster preparedness training. Such measures prove highly effective in saving lives and livelihoods in vulnerable regions around the world. Importantly, many risk-reduction measures are low cost and are relatively simple to implement.

## Plugging the leaks

Ensuring that post-disaster resources re-circulate within the local economy, rather than leaking out of it.



<b>'Leaks' from the local economy</b>	<b>'Plugs' to stop the leaks</b>
Aid staff use foreign-owned hotels and services	Ensure staff localise spending on services
Payments to foreign consultants and contractors	Support local NGOs and businesses
Purchase of foreign reconstruction materials and agricultural/medical inputs	Localise purchase of recovery materials and inputs
Crop and business losses	Introduce disaster insurance against crop and business losses
Profiteering and corruption	Work with governments, NGOs and communities to stop corruption
Economic markets lost to competitors during economic recovery	Provide small enterprises with flexible credit during recovery period
Long-term development aid redirected to disaster response	Ensure fresh funds for disaster recovery
Long-term commodity-price decline	Commodity-price support for primary commodity-dependent regions
Higher risk-related returns expected on investment	Ensure 'investment measures' are not undermined
Post-disaster flight of capital	Introduce controls in high-risk areas to prevent destabilising capital flight
Costs of flying aid in rather than procuring locally	Establish targets for local procurement
Local initiative and ownership of recovery undermined by donor-driven aid	Rebuild social economy through community-designed reconstruction

(Source: *World Disasters Report 2001*)

The best approach to reducing disaster risks in Africa is a systematic one, which becomes mainstreamed into relief and development planning. This protects programmes from being undermined by future hazards, and ensures that projects do not inadvertently increase vulnerability. As the UK's Department for International Development (DFID) observes: "Effective integration of disaster risk reduction into development will help transform 'vicious spirals' of failed development, risk accumulation and disaster losses into 'virtuous spirals' of development, risk reduction and effective disaster response. Gains include a wide range of positive impacts on progress towards MDG."<sup>78</sup>

Yet despite the clear rationale, donor organisations tend to approach disaster risk reduction on an ad-hoc basis, normally as a reaction to a major disaster, rather than systematically integrating it into their development planning and programming. This was the conclusion of extensive research on donor policy towards risk reduction.<sup>79</sup> Much progress needs to be made in donor organisations in terms of understanding, owning and prioritising risk reduction as an integral component of all activities within Africa.

The finding was confirmed by DFID in its recently commissioned study on the links between risk reduction, poverty and development.<sup>80</sup> "Disaster risk reduction has not so far received serious attention as a facet of development, despite the increasing seriousness of disaster impact." A core recommendation of DFID's study is that donors should "...establish and implement time-bound strategies for incorporating the reduction of risk from disasters as a central concern of development policy and programming as well as of humanitarian work, and for promoting and supporting a risk reduction agenda amongst their various development partners globally."<sup>81</sup>

Thousands of lives could be saved each year and economic losses prevented in Africa if more emphasis was placed on this issue. For example, in Mozambique a well co-ordinated community-based early warning system was put in place after the devastating floods in 2000. When another flood occurred a year later, the impact was significantly reduced. Disaster risk reduction can also be highly cost-effective. It has been estimated that for every \$1 spent on preparing for disaster, a further \$7 is saved in the cost of recovering from it.

There is now a clear political mandate to invest in disaster risk reduction in Africa. At the World Summit on Sustainable Development (WSSD) in 2002, all governments agreed to "Provide financial and technical assistance to strengthen the capacities of African countries... including at the local level, for effective disaster management, including observation and early warning systems, assessments, prevention, preparedness, response and recovery."<sup>82</sup>

### **Low-cost ways to reduce vulnerability: disaster-resistant housing<sup>83</sup>**

Floods are a normal part of life in much of Bangladesh, and typhoons in the Philippines. Various traditional housing techniques have been formulated to cope with this situation. ITDG worked with communities regularly affected by monsoon floods to develop a design for a flood-resistant house. It used available low-cost materials and local skills, and built on local skills and knowledge. The approach could readily be applied in other countries affected by floods and storms, like Mozambique.

Success depends on collaboration between local masons and carpenters and any outside experts. In Bangladesh, an improved attic to be used as living and storage space during times of floods resulted from contributions from the community on how to improve the housing design.

Poorer people cannot afford more water-resistant materials like corrugated metal, and have to suffice with thatched roofs, walls of woven grass or palm and bamboo. But, innovative methods can be applied, building on local traditional methods. Weaving, and joining bamboo and timber to form joists, results in a building that can withstand typhoon-force winds through its very flexibility, better than a rigid building of modern materials. Where the floodwater level is not normally too far above normal water level, houses can be built on raised earthen platforms.

Planting water-resistant plants and trees such as bamboo and banana next to homesteads helps to protect the houses from erosion. Food, household items and crops are stored on a platform in the main living room. An added benefit is that the structure using woven walls can be designed to be dismantled in the event of a severe flood forecast, and moved for re-erection on a new site or restoration after floodwaters subside.

It is not necessary to wait years for more research on climate change before investing in disaster risk reduction. Governments have agreed on the need for action, and tools and methods for protecting communities from disasters are well developed. Now they need to be employed immediately in African countries and communities on a much greater scale.

## Lessons learnt from the Tsunami: coastal management to reduce the impact of hazardous climatic events

### High death toll directly related to coastal 'development' for fisheries and tourism

Damage to Africa from the waves from the tsunami of 26 December 2004 was minimal compared to Asia, but there was a serious local impact in Puntland State, Somalia where the village of Hafun was devastated, many other villages damaged, over 1,000 homes destroyed and 2,400 fishing boats smashed, plus freshwater wells and reservoirs made unusable.<sup>84</sup>

Also, the tsunami was the result of an earthquake, not global warming, but the lessons about managing disasters apply to a warming world. Analysis of the places worst hit in Asia show that in many cases they had been developed for fish farming and tourism. In both cases, development required the destruction of the natural vegetation, and often resulted in the destruction of inshore coral reefs through over fishing or intensive use of motorised fishing vessels.

Tropical mangroves are amongst the world's most important ecosystems, providing a variety of goods and services to coastal communities and protecting inland areas from violent storms and tidal waves. They stabilise sediments, reduce shoreline and riverbank erosion, regulate flooding, and recycle nutrients. Mangroves provide a nursery area for three quarters of the commercial fish species that spend part of their life cycle in the mangrove swamps. Each acre of mangrove forest destroyed results in an estimated 300kg loss in marine harvest.

Despite these multiple benefits, shrimp farming in southeast Asia that displaces the mangroves has been encouraged, aided by World Bank loans, for the sake of earning foreign currency. The industry is eating away more than half of the world's mangroves. In Indonesia, at the time the tsunami struck, logging companies were busy axing mangroves in the Aceh province for exports to Malaysia and Singapore. The tourism boom in the Asia-Pacific region coincided with the growth in shrimp cultivation. What is being projected as an indicator of spectacular economic growth hides the enormous environmental, and ultimately human and economic costs that these countries have suffered.

### Mangroves and coral reefs protect against storms and tsunamis

Myanmar and the Maldives suffered very much less from the impact of the tsunami because the tourism industry had so far not spread to the virgin mangroves and coral reefs surrounding the coastline. The large coral reef surrounding the islands of Maldives absorbed much of the tidal fury thereby restricting the human loss to a little over 100 dead. Mangroves help to protect offshore coral reefs by filtering out the silt flowing seawards from the land.<sup>85</sup>

The epicentre of the tsunami was close to Simeulue Island, in Indonesia. The death toll on this particular island was significantly low simply because the inhabitants had the traditional knowledge that a tsunami invariably happened after an earthquake and fled to higher ground in time. They also attribute minimal damage of their island and minimal loss of life to the protective belt of mangroves that surrounds their island and has not yet been destroyed.

### Mangrove and coral reef restoration: cost-effective disaster prevention

The challenge, therefore, for developing countries is to learn from the time-tested approaches that have been perfected by the local communities. Fisherfolk have the expertise to be the primary managers of the health of the coastline and rehabilitate fisheries. When given the opportunity, they manage the shoreline, mangroves and coastal fishing zones – the source of most of the aquatic diversity and health of the oceans. The massive tsunami aid effort must work with such fisherfolk and support their organisations and use their expertise to ensure the restoration of their livelihoods, re-equipping them for sustainable artisanal fishing, and, in the long-term, rehabilitating the coastline and marine fisheries to protect them from future storms and floods likely to occur as a result of climate change.

The government of Kerala state, observing that the tsunami left less destruction in Indian regions protected by mangroves than barren and exposed beaches, has already started a project for insulating coasts with mangroves.

## Bypassing Africa's women in tackling climate change<sup>86</sup>

When she received the Nobel Peace Prize in Oslo on 10 December 2004, Wangari Maathai described Africa's women as "the primary caretakers, holding significant responsibility for tilling the land and feeding their families". As a result, she said, they are often the first to become aware of environmental damage – including climactic instability – as resources become scarce, and have problems sustaining their families. The founder of Kenya's Green Belt Movement pointed out that women involved in the movement have planted 20–30 million trees in Africa to counter forest loss and slow the spread of the deserts. She suggested that, "an holistic approach to development, as exemplified by the Green Belt Movement, could be embraced and replicated in more parts of Africa and beyond". Maathai urged African governments, led mostly by men, to do more about climate change. She has also urged them to have more respect for traditional knowledge and for women's experience while addressing this and other problems.

Yet, the reality is that women in Africa have limited access to productive assets, including land, and to other things necessary for production like credit and education. Women's work, even in food production, is undervalued. In Sub-Saharan Africa, women produce 80 per cent of the crops, but own only one per cent of the land. When a woman does own land, her holdings tend to be smaller and less fertile than those of men. Land reform schemes have often displaced complex systems of land use and tenure in which women had certain rights in common law and local practice, if not in legislation. New land titles are usually registered in the name of a male household head, regardless of women's economic contribution to the household, their customary rights, or the increasing number of female-headed households.

African women receive less than ten per cent of the credit to small farmers and one per cent of the total credit to agriculture. Their work of processing food – including such tasks as threshing, drying, winnowing, peeling, grating, sieving and pounding – and domestic tasks, such as fetching water and firewood, are largely invisible because little data are assembled. Men can also influence the uptake of new energy technologies in the women's domain of the kitchen. In one case in Zimbabwe, men are reported to have rejected the use of solar cookers by their wives, since technology and its development are seen traditionally as a male preserve. But steps could be taken to improve the situation. Ensuring that women's knowledge is preserved, for example, by documenting this knowledge and women's survival strategies in dryland areas and their expertise in integrated water management.

Country case studies throughout Africa – and emerging macroeconomic analysis – consistently show that gender-based inequality acts as a constraint to poverty reduction and sustainable development. These differences are too important to ignore, and their impacts too severe, especially given Africa's chronic food insecurity and environmental vulnerability.

# Migration

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Numbers of refugees could be about to increase dramatically over coming years as a direct result of the way that the rich global elite lead their lives. Global warming, more than war or political upheaval, stands to displace many millions of people. And climate change is being driven by the fossil-fuel-intensive lifestyles that we enjoy so much.

Environmental refugees are already with us. They are people who have been forced to flee their homes and even cross borders primarily because of environmental factors such as extreme weather events, drought, and desertification. There are probably more of them already than their 'political' counterparts – 25 million environmental refugees in the mid-1990s, according to Oxford academic Norman Myers, compared to around 22 million conventional refugees at the same time. By 2050, mostly due to the likely effects of global warming, there could be over 150 million.

The effects of this scale of population movements will be highly destabilising to the global community unless they are carefully managed. Without action, the countries least responsible for creating the problem – poor developing nations who already are the major recipients of refugee flows – stand to carry the largest share of additional costs associated with environmental refugees. For example, as a consequence of global warming, Bangladesh, one of the poorest countries in the world, expects to have around 20 million such environmental refugees in the coming years.

People can claim refugee status where persecutory action by states leads to the oppression of individuals. And the environment can be used as a tool to harm, as is the case when communities are the victims of deliberately flooded valleys, of relocation to marginal unproductive land or of the destruction of livelihoods through deforestation. Policies that either fail to abate, or worsen, global warming could fall into the category of 'environmental persecution'. It might, therefore, be possible to protect environmental refugees under a reinterpretation of existing international law.

Although they do not confer any legal status, the UN's Guiding Principles on Internal Displacement are a widely used tool that consolidates existing principles of human rights and international humanitarian and refugee law. It then applies these principles to the needs of people forced to leave their homes but remaining within their countries of origin – including as a result of natural or human-made disasters such as climate change. But, in certain circumstances, however, the suggestion that the solution must lie purely at the national level could be absurd,

for example, when the national level is under water. At least five small island states are at risk of ceasing to exist due to predicted sea level rises. In Africa it is the impact on farming that could force people to leave their homelands. Although Africa's farmers have proved skilled at adapting to changing rainfall patterns over decades, global warming threatens to stretch coping mechanisms beyond breaking point. Large-scale population movements already occur due to droughts and floods; as these worsen more people are set to become both internally displaced and to flee across borders.

Sea-level rise in the range expected by the IPCC would devastate the Maldives. Up to 10 million people could be displaced in the Philippines, millions more in Cambodia, Thailand, Egypt, China, and across Latin America. If the flow of the Nile reduces (and sea levels rise), the most densely populated part of Africa will be hugely disrupted – affecting an estimated 66 million people (2002) projected to rise to nearly 90 million by 2015, nearly all living along the banks of the Nile.

Creating new legal obligations for states to accept environmental refugees would be one way to ensure that industrialised countries accept the unintended consequences of their fossil-fuel-intensive lifestyle choices.

Just as the 1951 Geneva Refugee Convention provides protection for people fleeing persecution, a new international treaty could address the current gap in the international legal system by conferring special status and rights on environmental refugees, forced to flee their country where it cannot meet their needs due to the scale of climate change impacts.

Numerous poor countries already cannot afford to meet the basic needs of their people. Without status, environmental refugees could be condemned by a global problem to a national economic and geographical lottery, and to the patchwork availability of resources and the application of immigration policies. There is a wide acceptance that current national policies would not be remotely capable of handling the scale of the problem. Environmental refugees need recognising, and the problem needs managing before it manages us.





Photo: Jim Loring/Tearfund

# Conflict

## Climate change and conflict in northwest Kenya<sup>87</sup>

The way of life of the Turkana people – nomadic pastoralists who graze huge herds of cattle and other animals on the dry savannah of northwest Kenya – has long been made more precarious by political pressures from outside. Their ability to roam was restricted by arbitrarily imposed colonial borders, and modern governments have not done much to help them.

Now powerful forces outside their control increasingly threaten the very survival of the Turkana. Rainfall seems to be failing and this has become a trigger for conflict between the Turkana and their neighbours, even as armed groups from outside, and a flood of automatic weapons, spill over from the long-running conflicts in neighbouring southern Sudan and northern Uganda.

Very much in line with models of climate change in Sub-Saharan Africa, droughts in northwest Kenya appear to be becoming longer and more frequent. The Turkana have names for them. The latest is *Kichutanak*, which started in 1999. This drought has continued, with only poor and sporadic rains, right through until today (March, 2005). *Kichutanak* means “it has swept away everything, even animals”. The Turkana had barely recovered from the previous prolonged four-year drought of 1992–95 called *Longuensil*, meaning “when the man with no legs from Oxfam came”, a reference to an Oxfam member of staff with a disability. In 1979–80 came *Lopiar* or “sweeping everything away”, which spread over two years. The previous severe droughts had been in 1970 – *Kimududu*, meaning “the plague that killed humans and livestock” – and in 1960, the year called *Namotor*, meaning “bones exposed”.

The Turkana are used to dealing with drought and with food shortages. But because the droughts are more frequent and more prolonged, they have less opportunity to recover from a poor rainy season before the next is upon them. Also, rain is less predictable than it used to be. Even in the longest drought, rains come to some places at some times. They could tell, from natural signs, when rains would come and where they would fall. Now rain, when it comes, may be sudden, violent and unpredictable.

There have always been tensions between the Turkana and other pastoralist groups for access to water and pasture. But these have increased as water sources have dried up and pastures been lost. Because the water table is not being recharged, the wetland areas that the Turkana could traditionally fall back on in times of drought have dwindled. Even the huge Lake Turkana has receded.

Territorial disputes have become more common as the lake recedes, taking with it the landscape features that formed traditional boundaries between groups. Many such disputes are settled peacefully, but each time one party or the other is perceived to have broken an agreement, the willingness to trust the next time, and to respect borders, is eroded.

Cattle raiding is also linked to drought. Raiding has always been used as a strategy to restock herds during or after a drought. Not surprisingly, prolonged drought and more cattle deaths leads to more raids. Last year a particularly big raid saw a coalition of the Toposa from Sudan and the Dodoth from Uganda take away large numbers of Turkana cattle. And raids lead, in turn, to new cycles of retaliation.

The marked increase in violence and killings, however, is associated with changes in the nature of conflict. Guns and bullets are cheap and plentiful and wars in neighbouring countries have led to a brutal form of predation replacing the traditional form of raiding. The Turkana face raids from a motley variety of well-armed gangs and rebel groups whose motives are often to seize cattle to sell for profit. These raids, unlike those undertaken in order to re-stock cattle, are carried out on a large scale and are extremely violent. They obey none of the traditional rules that tended to limit violence.

As a result of the droughts and growing insecurity, the Turkana have moved from a state in which they are able to cope most of the time, to one in which destitution and vulnerability to famine is a constant danger. International aid agencies like Oxfam have been providing relief food and still continue to do so, because the latest rains at the end of 2004 were patchy and poor. Oxfam’s approach is not just to give out food, but to link human and animal health, relief and development, and to help Turkana institutions that are trying to tackle the problems of cross-border raiding using conflict reduction and peace-building techniques.

## Conflict and water: peace-building between tribes in northern Kenya<sup>88</sup>

Recurring drought in arid and semi-arid lands has long been a major natural hazard, causing mass livelihood losses, hunger, conflict, and internal displacements. Rainfall in such areas is always unreliable and erratic and most have seasonal sandy streams that are only active for a short period of time during any rainfall event. Climate change is causing a reduction in the amount and the pattern of rainfall. Coupled with other pressures on the natural resources of their rangelands, pastoral farmers are experiencing increasing conflict with each other over access to scarce water.



*Teams of Samburu and Turkana women and men working together on constructing a sand dam*

During the dry periods they get water for themselves and their livestock by scooping into the sand beds of the dry streams. Water in such sites is usually clean for drinking but finite and quickly depleted. Sand dams are an artificial enhancement of this traditional practice that puts extra water into the sand beds to recharge and store water for use. They're made by building a concrete wall across the channel at specific sites to trap and hold back the sand during flooding; this creates an additional sub-surface water bank for harvesting.

With careful siting, the total amount of water available in the sand dams can be considerable, over 6000m<sup>3</sup>. Sand dam technology has been used successfully in Kenya in Kitui, Machakos and Samburu districts. Other countries with similar dry environments such as Ethiopia and Namibia have also used sand dams. Compared to other water-harvesting techniques, the benefits include provision of clean water for households, control of erosion, and improved water infiltration. Sand dam sites witness plants regrowing which attracts other biological resources and ecosystems threatened by drought. The project is costly in terms of getting people involved and it is labour intensive. But it is also culturally acceptable and has the potential to alleviate the region's water shortages and benefit livelihoods.

Constructing sand dams gave ITDG the opportunity to help build peace between tribes in conflict over scarce resources. Teams of Samburu and Turkana men and women working together built the dams. A condition of the project was that equal numbers of each tribal group and of men and women, should work together,



*The completed dam after the rains*

which helped informal interaction and renewed recognition between the tribes of common problems.

The improvement of shallow wells and the desilting of water pans reduced the deaths of both people and livestock. The construction of water troughs at the wells has allowed more animals to be watered, at the same thereby reducing congestion and conflicts from water users. These improvements to existing water resources, coupled with better management, opened up underused rangelands and lead to environmental protection and rising livestock productivity, despite poor rainfall.

# Official development policy and climate change

*“Since the United Nations Conference on Environment and Development, sustainable development has remained elusive for many African countries. Poverty remains a major challenge and most countries on the continent have not benefited fully from the opportunities of globalisation, further exacerbating the continent’s marginalisation.”*

**Johannesburg Plan of Implementation,  
2002, World Summit on Sustainable Development.**

The challenge of global warming is arriving late on many official agendas. When a much-heralded report from the UK Government about climate change and Africa was finally made public, the fact that the only issue considered in any detail was the need to improve weather forecasting, led to widespread disappointment.<sup>89</sup>

Although more scientific capacity is needed to help Africa cope with global warming, such research will only be effective if it results in strengthening the people’s ability to cope who live in the places most affected by climate change. Resources are always limited and the danger is that a focus on increasing scientific capacity will happen at the expense of investment in adaptation at the community level. Many already have no choice but to adapt to change, and need additional support to strengthen their resilience now. This report has outlined what several of those approaches could be. Building scientific expertise, on the other hand, may take years. However, the report’s recommendation that awareness of climate change must be ‘mainstreamed’ within development policies, planning and activities is welcome.

More high profile and broader ranging was the independent *Commission for Africa* report initiated by the UK Government. It contained five broad recommendations, which governments are not obliged to implement, touching on environmental and climate change issues.

- 1 It supported the Environment Initiative of the African Union’s NEPAD programme, suggesting that donors should strengthen environmental considerations in their programmes.
- 2 Donor governments and institutions, such as the World Bank, UNEP and UNDP, were asked to encourage African governments to include sustainable development in their poverty reduction strategies, and to monitor their environmental performance.

- 3 Donors should work to improve the climate observation network through the Global Climate Observation System, bilateral support.
- 4 Rich countries were encouraged to set targets to use cleaner energy technologies in order to stimulate the global market, and to encourage their use in developing countries.
- 5 Giving one actual target, it also called on donors to make climate variability and climate change risk factors an integral part of their project planning and assessment by 2008. They were also called on to meet their commitments on funding, which currently amount to only \$0.41 billion per year spread across all developing countries, to help African countries adapt to the risks and impacts of climate change.

The wider focus of the Commission’s report was welcome, as was recognising the need to consider risk factors in development planning, and funding for adaptation. But considering the fact that these are recommendations from an independent commission, free of the need to work within the strict parameters of existing government policy, they are weak in a number of regards. They fail to capture the urgency and comprehensiveness of the threat posed by climate change. They fail to call for a proper assessment of the new resource needs that Africa will face. The complex new obstacle that global warming puts in the path of achieving the Millennium Development Goals is inadequately appreciated. Finally, and crucially in the context of glacially slow and often vague international negotiations, the recommendations are almost completely empty of concrete targets and timetables.

Firmer promises were made much earlier in 2002 at the tenth anniversary of the Earth Summit in Johannesburg. There, governments agreed to take action to assist African countries adapt to climate change. In the *Johannesburg Plan of Implementation* all governments pledged to:

- *“Combat desertification and mitigate the effects of drought and floods...including through the provision of adequate and predictable financial resources to implement the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa, as one of the tools for poverty eradication.”* {paragraph.6(l)}

- *“Assist African countries in mobilizing adequate resources for their adaptation needs relating to the adverse effects of climate change, extreme weather events, sea-level rise and climate variability, and assist in developing national climate change strategies and mitigation programmes...”* {paragraph.56(k)}
- *“Provide financial and technical assistance to strengthen the capacities of African countries, including institutional and human capacity, including at the local level, for effective disaster management, including observation and early warning systems, assessments, prevention, preparedness, response and recovery.”* {paragraph.59(a)}
- *“...in cases of most acute water scarcity, support efforts for developing non-conventional water resources...”* {paragraph.60(d)}
- *“Achieve significantly improved sustainable agricultural productivity and food security...”* {paragraph.61}

But three years on, African communities are still struggling to cope with climate variability and extreme weather events, and the agreements made in Johannesburg remain largely unfulfilled. When it comes to rich, high-polluting countries fulfilling their obligations, the difference between rhetoric and reality gets wider the deeper you go.

The United Nation Framework Convention on Climate Change (UNFCCC) requires all signatory countries, and especially the developed countries, to assist the poorest and most vulnerable countries, namely the Least Developed Countries

(LDCs) and the Small Island Developing States (SIDS), to adapt to the impacts of climate change.<sup>90</sup>

At the seventh Conference of Parties (COP7) of the Convention, held in Marrakech, Morocco in 2001, a special fund to assist the LDCs – the LDC Fund – was set up with voluntary contributions from the rich countries to assist the LDCs adapt to the potential impacts of climate change. The LDCs comprise nearly fifty of the poorest countries in the world, the majority being located in Sub-Saharan Africa, the others being in the Asia-Pacific region. Under the arrangement each country has been provided with just around \$200,000 to carry out a National Adaptation Programme of Action (NAPA).

However, the contributions to the LDC Fund up to April 2005 amounted to only about \$33 million of which \$12 million is to be used by the LDCs to carry out the NAPAs, and only \$21 million will be available for implementing adaptation measures identified through the NAPAs. To put that into context, to protect of the vulnerable portion of the coastline of Dar es Salaam against sea level rises over the course of the century, would cost US\$380 million.<sup>91</sup>

Out of these contributions, the amount from the G8 countries has been \$6.5 million from Canada, \$3.7 million from Germany, \$0.3 million from France and \$1 million from Italy. Yet, as mentioned above, France announced \$748 million in extra funding for its own hospital emergency services in the summer of 2003, after an estimated 11,435 people died during a record-breaking heatwave.<sup>92</sup> Notably, several of the richest countries of the G8 such as the US, the UK and Japan, who are all major greenhouse gases emitters, have yet to donate a single penny to the fund.<sup>93</sup>

## The Make Poverty History Coalition

Members of the Make Poverty History Coalition recognise climate change is already affecting the poor, and that the essential policy changes we demand on trade justice, debt and aid will be seriously undermined unless climate change is also tackled. Make Poverty History therefore welcomes the fact that climate change is high on the political agenda this year. Make Poverty History has prioritised trade justice, debt and aid for the focus of our campaigning in 2005. We are supportive of the work of other coalitions working on climate change and, recognising the importance of coordination, seek to work with them where possible. Make Poverty History also welcomes the support for our demands from the environmental movement and coalitions campaigning on climate change.

**March 2005**



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# Supporting organisations (The Working Group on Climate Change and Development)



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